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DIVISION OF COMMERCIAL FISHERIES

COOK INLET AREA
ANNUAL SHELLFISH MANAGEMENT REPORT

1992-93

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[1]Contribution from the Homer area office. The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

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INTRODUCTION

The Cook Inlet Management Area, Statistical Area H, is bounded on the east by the longitude of Cape Fairfield (148° 50' W. long.) and in the south by the latitude of Cape Douglas (58° 52' N. lat.). The management area is divided into six shellfish districts: Southern, Kamishak, Barren Islands, Outer, Eastern and Central (Figure 1).

A discrete management area (G) has been established specifically for the trawl and pot shrimp fisheries in the Outer and Eastern Districts (Figure 2). Area G has its boundaries at the longitude of Cape Fairfield on the east and a line drawn from the westernmost tip of Point Adam to the westernmost tip of Cape Elizabeth and south along 151° 53' W. longitude on the west.

This report covers the most recent shellfish fisheries in Cook Inlet: 1993 Tanner crab (Chionoecetes bairdi), 1992 razor clam (Siliqua patula), hardshell clams, blue mussels (Mytilus edulis), octopus (Octopus dofleini), 1992-93 green sea urchins (Stronglyocentrotus droebachiensis) and the 1992-93 Area G trawl and pot shrimp fisheries. The 1992 seasons for scallops (Patinopecten caurinus) and sea cucumbers (Parasitichopus californicus) were open but no one fished. The 1992 seasons for red king crab (Paralithodes camtschaticus), and the 1992-93 Area H trawl and pot shrimp fisheries were closed due to low stock conditions. The catch data from the 1992 Dungeness crab (Cancer magister) and Area G trawl shrimp fisheries are confidential. This is due to department policy making catch information confidential when the catch is taken by two or less fishermen. The Southern District, which has yielded virtually all of the historic commercial Dungeness harvest, remained closed in 1992. A summary of the king crab, Dungeness crab, sea cucumbers, scallop and shrimp

stocks as well as historic fisheries are given in this report. Emergency orders affecting these fisheries are listed on Table 1.

Shellfish landings from the Cook Inlet Management Area (H) included 534,003 pounds of Tanner crab, 296,727 pounds of razor clams, 54,631 pounds of hardshell clams, 2,501 pounds of blue mussels, 6,119 pounds of green urchins and 7,447 pounds of octopus. Area G pot shrimp harvest was 2,804 pounds. Area G trawl shrimp harvest and Cook Inlet Dungeness are confidential since two or less fishermen participated in the respective fisheries.

The approximate exvessel value by species was $854,000 for Tanner crabs, $143,000 for razor clams, $11,000 for octopus, $95,000 for hardshell clams (including mussels) and $6,000 for green urchins. Exvessel values for Area G pot and trawl shrimp were $14,000 and $225,000, respectively. Total estimated exvessel value of all shellfish species for the Cook Inlet Management Area was approximately $1.35 million.

TANNER CRAB FISHERY

Introduction

Tanner crab fishing has occurred in six of the districts in the Cook Inlet Management Area (H): Southern, Kamishak, Barren Islands, Central, Outer and Eastern (Figure 1). Historical catch, since inception of the minimum legal size in 1976, has ranged from 408,000 pounds in 1992 to 5.7 million pounds in 1978-79 (Figure 3, Appendix A). The number of participating vessels has ranged from 7 in 1990 to 137 in the 1988 season. The entire management area was closed for the 1989 season due to depressed stock conditions.

The Southern District is fished by both small and large vessels. The fishery occurs in the relatively protected waters of Kachemak Bay. Approximately 50 percent of the vessels do not have circulating crab tanks. The Homer and Seldovia boat harbors, home ports to most of the fleet, are no more than a three hour run from the geographic extremes of the district. Fishing depths range from 5 to 95 fathoms, but generally are between 30 and 55. Historical annual harvests have ranged from 270 thousand to 2.9 million pounds. The fishery was closed in both 1989 and 1990 due to depressed stock conditions. Recent vessel effort has been high with 136 boats fishing during the 1993 season and 110 boats in the 1992 season (Appendix A).

The Kamishak Bay and Barren Islands Districts are often considered one management unit because survey, fishery and tag recovery information show that these two districts contain a single stock of Tanner crabs. The fishery in the Kamishak and Barren Islands Districts occurs in open waters subject to severe weather and icing conditions, as well as extreme tides and seasonal ice flows from upper Cook Inlet and Kamishak Bay itself. All participating vessels have circulating sea water systems. The smallest vessels are generally 50 feet in keel length. These smaller vessels are often extremely limited in fishing time due to the weather conditions. Many fishermen generally fish around the clock; the boats jog while the gear soaks. Safe anchorage from storms is located behind Augustine Island or in Iniskin Bay. Fishing occurs in a 15 to 90 fathom depth range. Historical catch since full development of the fishery and implementation of the legal minimum size has ranged from 0.4 to 3.3 million pounds. The fishery was closed in 1989, 1992 and 1993 due to depressed stock conditions. Vessel effort has ranged from 7 to 28 boats (Appendix A).

The Outer and Eastern Districts are located in the Gulf of Alaska bordering the Prince William Sound Management Area (E) on the east at Cape Fairfield. Recently this fishery has occurred in or near

the mouths of the many fjord like bays along the outer coast of the Kenai Peninsula; however, the exposed open waters in the Gulf of Alaska portion of these districts once provided significant portions of the catch. The fleet in these districts is characterized by both small and large vessels, the smaller boats fishing the bays and the larger vessel fishing both the bays and the open ocean. Poor weather conditions impact all of the boats since the smaller vessels must negotiate open ocean waters to reach gear placed in the bays both east and west of Seward, which is the delivery point for most of the crabs. Some crabs, however, are delivered to Homer resulting in an equally rough trip from the bays of the outer Kenai Peninsula to Homer.

This crab stock has suffered the same severe decline in abundance as the stocks as far east as Yakutat. Historical catch since implementation of the minimum legal size in 1976 has decreased from 800,000 to 50,000 pounds. The fishery was closed from 1989 through 1991 and 1993 due to depressed stock conditions. Vessel effort has ranged from 7 to 25 boats (Appendix A).

The regulatory season for the entire management area is from January 15 through March 31. The season may be terminated earlier by emergency order. The opening date of January 15 was first implemented in 1987. The season opening was November 1 from the periods 1983 to 1986 and 1972 to 1974. The opening was December 1 from 1974 to 1983. The season for the Southern District fishery may be delayed if weather conditions indicate potential damage to exposed crabs.

In the Southern and Kamishak/Barren Islands Districts the emergency order is utilized to close the fishery once the guideline harvest level is achieved. The Outer and Eastern Districts close either based on decline in catch per unit of effort (CPUE) or by regulation on March 31.

The Department has tagged Tanner crabs for a number of years in the Southern, Kamishak Bay and Barren Islands Districts. Thus far there has been no interchange of legal males between the Southern District and the Kamishak/Barren Islands; however, tag recovery has indicated the Kamishak Bay and Barren Islands Districts' Tanner crabs are one stock. Furthermore the legal males tagged in these two districts have been captured in Kodiak's North Mainland Section, but only on a regular basis as far south as Douglas Reef, which is approximately 5 miles south of Cape Douglas (Figure 1).

Regulations distinctive to the Cook Inlet commercial Tanner crab fishery are:

1) Superexclusive registration.

2) Registration prior to the season opening.

3) Gear storage in the Kamishak and Southern Districts in 15 fathoms or less, except in the eastern portion of the Southern District where it is 10 fathoms or less.

4) A 40 pot limit in the Southern District if the guideline harvest level is less than 800,000 pounds. A 75 pot limit if it is more.

5) Buoy identification tags are required in the Southern District to assist with the pot limit enforcement.

6) A requirement for two 4 3/4 inch escape rings on all gear.

1993 Season Summary

Only the Southern District was opened to commercial fishing in 1993. The total catch in the Southern District was 534,003 pounds taken by 136 vessels. Due to continued low stock abundance the Kamishak Bay, Barren Islands, Central, Outer and Eastern Districts were not opened.

Southern District

The 1992 Department Tanner crab survey in the Southern Distict indicated that the stock was continuing a modest short term recovery, therefore a guideline harvest level of 600,000 pounds was established for the 1993 season. This figure represented an estimated fishing mortality of 30 to 40 percent.

Since this is a short term intense fishery characterized by a large number of boats fishing a limited number of crabs in a relatively small area, the department cannot rely on in-season fishery data such as catch per unit of effort to manage the fishery. It simply takes too long to collect these data and subsequently implement a closure without running a severe risk of overharvest. To remedy this situation the department sets the length of the season three days before the opening date. The number and size of vessels registered at that time is used in conjunction with historical catch per unit of effort data to determine how long it will take to harvest the quota. The resultant time is subsequently utilized as a season length.

By January 12, 1993, 116 vessels had registered for the fishery. The department estimated that another 10 percent would register between January 12 and noon January 15, which is the registration deadline. Therefore the estimated effort for the fishery was

approximately 130 to 135 boats. These effort data indicated that the 600,000 pound quota could be taken in 24 hour period.

Weather conditions on January 15 were conducive to survival of bycatch crabs, therefore the fishery was allowed to open by regulation. The forecasted weather was northwest winds to 15 knots increasing to southeast 25. The actual temperature and winds at the Homer Harbormaster's prior to the announcement to open the fishery were winds west 10 to 15 knots and temperature at minus 0.5 C (31 F).

The season closed by emergency order at 12 noon January 16. Of the total 139 registrants, 136 vessels fished and made deliveries. One vessel fished and did not catch any crabs, and two vessels did not participate. Total catch was 534,003 pounds. Deadloss accounted for only 1,257 pounds of the total. Overall catch per unit of effort was 19.7 legal crabs per pot. During the open period the 136 vessels made 10,660 pot lifts which means that each vessel pulled their 40 pots an average of 2.0 times during the 24 hour opening (Table 2).

Seventy six percent of the crabs were true recruits. Fourteen percent were postrecruits in the recruit size class (skipmolts) and the remaining 10 percent were postrecruits by virtue of both size and age (Figure 4). The average weight was 2.54 pounds per crab (Appendix B) and the average width was 152 mm (6.0 inches).

The crabs were purchased by two processors and deliveries were made both to the communities of Seldovia and Homer. The two major processors, as measured by their capacity to hold or process crabs, both stated definite intention to buy crabs. The entire harvest was therefore taken in a single opening as opposed to a split season, which occurred in both 1991 and 1992 due to limited processing capacity.

Seventy three of the boats were dry while 63 had circulating tanks. Ninety nine (73 %) of the fishermen were from the Homer/Anchor Pt. area; 11 were from Seldovia; 5 from Seward and the remaing 25 were mostly from Kenai Peninsula communities ranging from Ninilchik to Anchorage. A single fisherman was from Valdez and another was from North Pole. None were from Kodiak.

1994 Season Management Outlook

The Department will conduct a trawl survey for Tanner crab during 1993 in the Southern, Kamishak Bay and Barren Islands Districts.

The number of prerecruit ones caught in the 1992 trawl survey in the Southern District indicates that recruitment in 1993 may provide for a commercial harvest guideline for the 1994 season that somewhat less than the 600,000 pound guideline established for the 1993 season (Figure 5). It is difficult to be more precise about the 1994 season forecast since the level of skipmolting cannot be predicted prior to the molt. If a significant percentage of the prerecruit ones fail to molt (skipmolt), the reduced recruitment will result in a smaller guideline for the 1994 fishery (Appendix C). The fishery should once again be characterized by large crabs and slightly more postrecruits. Unless there is a total price collapse, vessel effort will remain high and the subsequent season length will therefore be in the 12 to 24 hour range again.

The 1992 trawl survey did not indicate that any near term recovery is likely for the stock in the Kamishak and Barren Islands Districts. Furthermore the trawl surveys conducted by the Kodiak office indicate that the stock condition south of the Cape Douglas management area dividing line is equally depressed.

A negative characteristic of the stock of Tanners in the Kamsishak/Barren Islands Districts is skipmolting in the prerecruit

one size class. It appears that once these animals skip a molt, the likliehood of them molting again is very small. Therefore the documented buildup of old shell (skipmolt) crabs will not produce any future recruitment into the fishery, but will instead remain as sublegals until succumbing to natural mortality (Figure 6 and Appendix C).

Although the Department does not survey the stocks in the Outer, Eastern and Central Districts, there is no reason to expect a miraculous recovery. Surveys in the remaider of Cook Inlet, as well as adjacent management areas, Prince Williams Sound and Kodiak, will continue to be utilized to determine conditions of the stocks in the Outer, Eastern and Central Districts. Total catch, catch per unit of effort and catch of sublegals from the 1992 season indicated that the near term outlook for a fishery in these districts is poor.

In summation, there is a good chance of another limited fishery in the Southern District in 1994. Conversely, survey and commercial catch data indicate a very limited probability of a fishery in the remaining districts. All 1993 Department surveys from Cook Inlet and adjacent areas will be reviewed prior to final determination of the 1994 season.

KING CRAB FISHERY

Introduction

There are two species of king crabs found in the Cook Inlet Management Area (H), red and brown (Lithodes aequispina). Red is the dominant species with brown found only in a scattered distribution in the outer Gulf of Alaska. Most of the red king crab fishery has occurred either in the Southern District or the

Kamishak/Barren Islands Districts. Very little catch has come from the Outer District and none has been documented from the Eastern District (Figure 1).

Earliest recorded commercial landings of king crab occurred in 1937 when crabs were canned at a Halibut Cove packing facility. Commercial fishing for this species remained at a relatively low level through the 1940's. By the mid-1950's harvest levels rose to approximately 2 million pounds per year. During the 1960's fishing expanded to the Kamishak Bay District and boats were harvesting up to 8 million pounds per year. In 1964-65 a significant drop in catch occurred in the Kamishak District primarily due to lack of processing facilities in the Seldovia area which was a result of earthquake damage in 1964. From the late 1960's through 1976 the seasonal catches ranged from 2.5 to 4.8 million pounds. Since that time catches have generally declined (Figure 7 and Appendix D). The commercial fishery has been closed due to low abundance since the 1981-82 season in the Southern District and the 1983-84 season in the Kamishak/Barren Islands Districts.

The current season opens by regulation on August 1. From 1983 to 1987 the season opening date was July 15. Prior to 1983 the season opened on August 1.

The minimum legal size for all species of king crabs is seven inches in carapace width with a provision for an eight inch season. The eight inch season, which may be opened and closed by emergency order, has been in effect since 1976. It was used during the 1976-77 season in all districts and during the 1977-78 season in the Kamishak/Barren Islands Districts only. The seven inch minimum legal size has been in effect since 1963.

Cook Inlet is a superexclusive registration area for king crab. The current pot limit is 75 if the management area guideline harvest level is greater than 1.5 million pounds. If the guideline

is less than 1.5 million, then the pot limit is 40. Similar to the Tanner crab fishery, there is a buoy tag requirement accompanying the pot limit.

1992 Season Summary

Southern District

No king crab harvest has been allowed in the Southern District since the 1981-82 season. Extreme low abundance as well as heavy infestation of egg predators in the female clutches necessitated maximum protection of the stock. Although the incidence of egg parasitism seems to have abated, the overall measurable abundance of king crabs remains very low.

The 1992 department trawl survey continued to identify a small group of post recruit males. These animals are a function of survival of successive weak year classes that have been subjected to little fishing mortality.

Kamishak Bay and Barren Islands Districts

The Kamishak/Barren Islands Districts were first closed to commercial fishing due to low abundance prior to the 1984-85 season. The commercial fishery has remained closed through 1992.

The 1992 trawl survey catch of king crabs indicated a depressed stock. Similar to the Southern District, the stock of king crabs in the Kamishak/Barrren Islands Districts was characterized by weak recruitment and continued small increases in the post recruit segment of the stock, which is a function of good survival due to no fishing mortality.

Outer and Eastern Districts

Brown king crabs have never been found in high concentrations in the Outer and Eastern Districts. Regulatory fishing for brown king crabs was authorized, via commissioner's permit, coincidental to the Tanner crab season in the Outer and Eastern Districts in 1988. No catch occurred due to lack of abundance of this species. Two vessels received brown king crab permits incidental to the 1992 commercial Tanner crab fishery in the Outer and Eastern Districts. Neither vessel delivered brown king crabs.

1993 SEASON MANAGEMENT OUTLOOK

Southern District

The department will conduct its annual Southern District king and Tanner crab trawl survey in July of 1993. It is improbable that the results from this assessment will indicate any significant increase in the legal segment of the stock, thereby justifying opening of the commercial, sport and personal use fisheries.

Kamishak Bay and Barren Islands Districts

The number of prerecruits caught in recent surveys does not indicate that recruitment will justify an opening of the commercial fishery on August 1, 1993. The Department will conduct the 1993 trawl survey in late June.

There will be no further effort to justify an eight inch king crab season as provided for by regulation since research on the reproductive capabilities of male king crabs, conducted by the Institute of Marine Science in Seward, indicates that the large males are more important to the brood stock than small males. Although large skip molt males may appear to be too old to mate,

the only conclusive method to determine breeding capability is examination of the gonads, which can only be achieved by killing the crab.

Outer and Eastern Districts

These districts will remain closed to the harvest of red king crabs until the overall stock in the remainder of the Cook Inlet Management Area recovers. Permits for brown king crab will be issued only if the Tanner crab season is opened.

Summary

The condition of the red king crab stock in the Southern District is severely depressed. Although the fecundity of the females is improving, the overall number of catchable crabs is at a historic low. It does not appear that a commercial, sport or personal use fishery is likely to occur at least for another three or four years, or more.

The buildup of postrecruits in the Kamishak District does not by itself justify a commercial harvest of these animals even if it is limited to an eight inch season. Available data indicate that these older, large males are essential in maintaining the highest possible reproductive capacity. This is essential to rebuilding the stock.

DUNGENESS CRAB FISHERY

Introduction

The majority of the commercial, sport and personal use Dungeness crab fishing in Cook Inlet has occurred in the Southern District

(Figure 1), which includes Kachemak Bay. During the 1960's and early 70's commercial catch and effort were usually not a function of resource abundance; the harvest instead was a result of market conditions created by fluctuation in the catches from the west coast Dungeness crab fisheries.

Catch and effort increased significantly in 1978 to 1.2 million pounds taken by 49 vessels. Subsequently, favorable market conditions and the need of fishermen to find alternative fisheries have kept effort high. Since 1978 annual harvests have ranged from a low of 29,502 pounds in 1990 to a high of 2.1 million pounds in 1979. The commercial fishery was closed in the Southern District in 1991 and 1992 due to low overall abundance. The average annual harvest since 1978 was 874,000 pounds, including the closure years (Figure 8). Effort has ranged from 23 vessels in 1990 to 108 vessels in 1982 (Appendix E). Since 1979, 92 percent of the crabs have been harvested between the months of June and October (Figure 9). After 1978, 59 percent of the annual harvest has been taken from the waters east of Homer Spit. The proportion however changes considerably on an annual basis, which is a result of varying recruitment between the waters east and west of the Spit (Appendix F).

Ninety percent or more of the Dungeness fleet are residents of Kachemak Bay communities of Homer and Seldovia. The fishing vessels are in the 40 foot and less size class. Smaller vessels without circulating tanks generally fish the waters east of Homer Spit while larger vessels with circulating tanks fish the deeper somewhat rougher waters west of the Spit.

Current regulations that are specific to the Cook Inlet Management Area are as follows:

1) A two part regulatory season for the Southern District which opens the waters east of Homer Spit by emergency

order on or after June 1 and closes no later than November 1, and opens the waters west of Homer Spit on June 1 and closes no later than November 1. The opening east of Homer Spit is contingent on department test fishing data indicating that the molt of adult crabs is over. This regulation was adopted by the Board of Fisheries in 1990.

2) Closure of Southern District waters in depths of 10 fathoms or less from January 15 through April 30. This regulation is irrelevant due to the adoption of the previous regulation.

3) A regulation adopted by the Board of Fisheries in 1986 that closed the entire Cook Inlet Management Area to Dungeness fishing during the 15 day period prior to the opening of the Tanner season, allowing for the removal of delinquent gear and a fair start for the Tanner crab fishery.

4) A 150 pot limit in the Southern District (not in effect in either 1979 or 1980).

5) A gear regulation that requires consecutive numbering of all buoys.

Statewide biological regulations for the commercial Dungeness fisheries consist of a males only harvest and a minimum legal size of 6.5 inches carapace width (165 mm). Gear regulations include a provision for two 4 3/8 inch escape rings per pot and a biodegradable twine requirement.

The Cook Inlet Dungeness fishery has evolved into a summer event for the following reasons:

1) Salmon fishermen are occupied with salmon fishing, thus creating a niche for fishermen who do not hold permits for limited entry fisheries.

2) The weather is better.

3) The catcher/seller sales to the tourist industry are at their peak.

4) The molt (recruitment) occurs.

Historically some level of fishing has occured throughout the year. Catch and effort, however, increase significantly after the major molt, which provides new recruit crabs. The significant molting times for adult males in Kachemak Bay can occur from late April through mid-September in any given year although the peak periods are June, July and August. The molt is stimulated by water temperature and physiological condition of the crab. The inconsistency in molt timing between years is partially explained by the significant annual spring-summer temperature variation in the shallower north temperate and sub-arctic waters of Alaska.

Within Kachemak Bay itself, molting generally occurs somewhat earlier in the waters east of Homer Spit than in the waters west of the Spit where the influence of Cook Inlet proper is much greater. Newly molted legal crabs are often caught east of Homer Spit one month or more before appearing in the gear west of the Spit. Crabs east of Homer Spit are most likely resident from the first post-larval instar up to legal size. Those legal crabs captured west of the Spit, however, may actually be reared as juveniles in the waters of Cook Inlet north of Anchor Point. Catches of small crabs by upper Cook Inlet salmon set netters and casual observations of molted exoskeletons by the general public indicate significant numbers of Dungeness reside in upper Cook Inlet.

Outside of natural population fluctuations, three fishing related factors have had a notable negative impact on this fishery:

1) Depression of the stock due to handling and trapping mortality that was the result of fishing during and immediately after the molting period.

2) Extremely high effort resulting from ease of access by both commercial and recreational fishermen.

3) Violation of the 150 pot limit by a portion of the fleet.

Bycatch mortality of Dungeness crabs during the China Poot Bay salmon seine fishery has also been of concern to the public including the recreational users and commercial Dungeness crab fishermen. The department and the Cook Inlet Seiner's Association met in 1991 to determine if a solution to the Dungeness seine mortality could be worked out while still allowing seiners reasonable access to the fish. Based on a common concensus the department issued an emergency order closing the upper portion of China Poot Bay for the entire seine season. This was the reported locale of the major portion of the seine mortalities. The seine season for sockeye salmon generally runs from the last week in June through the third week in July while the season for pink salmon extends to the first or second week in August. The department further agreed to prohibit future commercial Dungeness crab fishing with China Poot Bay during the commercial seine season. This prohibition eliminated a historical gear conflict.

The combination of extended heavy fishing pressure, and fishing during and immediately after the major molting period for adult males has played the most significant part in the recent sharp decline in the Dungeness crab harvest. Mortalities associated with handling and trapping may not have been significant during the 1960's and early 70's when effort levels were low and stock

abundance was high; however, since then the level of fishing has accelerated not only in amount of vessels and pots, but also in the amount of time each year that the gear is deployed.

In 1990 the department began a survey to further document the molt timing of the catchable Dungeness crabs and to establish an index of abundance. This survey in tandem with the crab trawl survey indicated one or two significant year classes moving toward the fishery (Figure 10). Although these animals appear numerous, particularly when compared to the surrounding weak year classes, the following must be weighed when considering the magnitude of this group of crabs: 1) they are only located in the portion of Kachemak Bay east of Homer Spit, and 2) they exhibited an extremely high level (approximately 50 %) of skipmolting in 1992, the year when they should have fully recruited into the fishery and provided significant numbers of both recruits and postrecruits available for harvest.

Considering the aforementioned two points and the absence of any other significant catchable year classes, the stock remains in a condition that will not tolerate a high level of fishing mortality given that a substantial degree of reproductive success is necessary to take full advantage of this relatively large group of adult crabs in the upper portion of Kachemak Bay.

1992 Season Summary

The commercial fishery was not opened in the Southern District (Kachemak Bay) in 1992 due to a relatively low number of legal males and the necessity to protect the remaining non-legal catchable crabs in the district from handling and trapping mortality.

1993 Management Outlook

The department will begin the 1993 Dungeness pot survey on May 17, 1993. The survey will be conducted on at least a monthly basis. If this survey, in association with the crab trawl survey, indicate that both a high level of the skipmolt crabs have molted, resulting in substantial recruitment into both the recruit and post-recruit size classes, and that another meaningful year class has recruited into the adult population, then a limited commercial fishery may occur.

In the meantime the commercial fishery will not open on the scheduled June 1, 1993 opening date. It will remain closed until department surveys indicate that the aforementioned growth and recruitment have occurred.

If a fishery is warranted, it will be based on the following four factors: 1) the timing of the molt and subsequent soft-shell period, 2) substantial recruitment, 3) the presence of another size class of adults to replace those that may be harvested in a fishery, and 4) the marketability of the crabs. The latter consideration will involve industry review of the test fish crabs once the department has determined that the major molt has occurred and the crabs are in a biologically hard shell condition.

The presence of another size class of adult males is important during this era of depressed stocks since one of the management goals, other than precluding the harvest, trapping and handling soft-shell crabs, is to rebuild these weak year classes by maximizing the reprodutive potential of the strong year class(es). If no additional adults are identified, other than the ones documented in previous surveys, an excess harvest of the males may cause females in the same cohort to go unfertilized.

Furthermore, recent research published by the Canadian Department of Fisheries and Oceans indicates that large female Dungeness would have difficulty finding a mate in intensively exploited fisheries since the large males are harvested by the fishery. If barren females occur in large numbers, the eventual weak recruitment will result in a continuation of the cycle of weak year classes. Moreover, there are no stocks of nearby Dungeness to provide recruitment via larval drift: the Dungeness in Kachemak Bay appear to be major portion of the adult Cook Inlet Dungeness population at this point in time.

If, however, a commercial fishery is justified in 1993, the following management strategy will be utilized:

1) The fishery will open no sooner than August 1 once the pot and trawl surveys are over.

2) Fishing will be allowed only in 10 fathoms or less in that portion of the Southern District east of Homer Spit, and 35 fathoms or less in that portion of the district west of Homer Spit. This will serve to protect a portion of the legal Dungeness that molt in deep water and remain there. It will also eliminate bycatch of king and Tanner crabs that also reside in deep water.

3) The fishery will occur for a thirty day period to allow ample time to harvest crabs but not allow for continued mortality on legal crabs as they move into shallower water. It will also prevent the bay from becoming a parking lot of haphazardly attended crab gear once a substantial portion of the catchable crabs have been taken.

The commercial season in the remaining districts of the management area will be open in 1993. The only district likely to see any effort is the Central District which is north of the Southern

District in central Cook Inlet. Although there are crabs resident at least part of the year in this area, fishing effort has been light as it is a difficult location to retrieve gear due to the tidal action and nature of the general outflow of Cook Inlet.

AREA H TRAWL SHRIMP FISHERY

Introduction

Cook Inlet is separated into two shrimp registration areas: Area H, which includes the Southern, Kamishak, and Barren Islands Districts; and Area G, which includes the Outer and Eastern Districts (Figure 2). The primary trawl shrimp fishery has occurred in the Southern District of Area H.

The Southern District (Kachemak Bay) trawl shrimp fishery is characterized by superexclusive registration and definitive management under the Kachemak Bay Trawl Shrimp Management Plan. This plan has three basic features:

1) An annual guideline harvest level determined from stock assessment surveys.

2) Annual harvest spread out over the entire fishing season utilizing three separate regulatory sub-seasons.

3) Sub-season harvest spread out in equal weekly guideline harvests.

Such characteristics allow practical use of fishery performance as an inseason management tool and maximize monitoring of the shrimp stock status throughout the year in an attempt to avoid overfishing. Also, two areas closed to trawl shrimp fishing are

maintained throughout the year (Figure 11): the first includes the majority of upper Kachemak Bay east of Homer Spit, originally established because this area consistently contained small, juvenile pink shrimp; the second includes Tutka Bay and Sadie Cove, established because the area encompassed by these bays lent itself to the potential of overharvest.

Commercial trawl shrimp harvests in Kachemak Bay reached the five million pound level in the late 1960's and remained near that level through the early 1980's (Figure 12 and Appendix G). Low stock abundance resulted in partial closures of the fishery during the mid-1980's and total closure beginning in the fall of 1986. Effort has varied from a low of one vessel during 1968 to a high of 23 in 1981. Prior to 1983, most commercial harvest and effort occurred west of Homer Spit, but between 1983 and 1986 virtually all effort shifted to the area east of the Homer Spit. The fishery has been closed from 1986 through 1992.

Pink shrimp (Pandalus borealis) historically made up the bulk of the commercial catch, with sidestripes (Pandalopsis dispar) seasonally making up a lower but often significant portion of the catch. Humpy shrimp (Pandalus goniurus) have at times comprised up to half of the harvest, but this species appears to undergo erratic population fluctuations and contributions to the most recent fisheries have been negligible. Coonstripe shrimp (P. hypsinotus) consistently made up less than five percent of the catch.

Trawl shrimp surveys have been conducted in Kachemak Bay since 1971. These surveys, which determine each season's guideline harvest level, have indicated significant declines in abundance and distribution of all pandalid shrimp stocks in Kachemak Bay since the late 1970's (Figure 13). These declines led to the aforementioned commercial closures from 1986 to 1992.

1992-93 Season Summary

The fishery remained closed for the 1992-93 season based on the results of the 1992 department trawl shrimp survey. The survey occurred during the month of May. The 900,000 pound population estimate generated by the survey indicated the lowest population of pandalid shrimp since the inception of the survey (Figure 13).

The distribution of shrimp has shown a shift in concentration from the head of Kachemak Bay to a more even distribution including the waters west of the Spit. During the earlier declining years of the population large survey catches of juvenile and male pink shrimp were taken in the upper portions of Kachemak Bay. The catchable age classes have now increased in number west of Homer Spit whereas they had been almost exclusively large females. The trend then seems to be away from aggregate distribution by size (and age) to a more even grouping throughout the bay.

All information collected during this survey indicated that, despite some shift in size composition and distribution, the stocks remained depressed by historical standards. The commercial fishery was closed therefore for the entire 1992-93 season.

1993-94 Management Outlook

The department will conduct the annual trawl shrimp survey in May 1993. A decision to reopen commercial fishing for the upcoming regulatory year beginning July 1 will rest primarily on the results of this survey. Based on the known life history information regarding growth and age of shrimp, the department has seen no evidence to justify a commercial trawl shrimp fishery in Kachemak Bay during 1993-94.

AREA G TRAWL SHRIMP FISHERY

Introduction

Area G is a nonexclusive shrimp registration area, encompassing the Outer and Eastern Districts of Cook Inlet (Figure 2). It was established by Board action in 1977. The first year of significant harvest occurred in the 1982-83 season when four vessels harvested 239,584 pounds (Figure 14 and Appendix H). The catch increased steadily for the next two seasons to a peak harvest of just under 2.0 million pounds taken by 11 vessels during the 1984-85 season. Prior to 1985, the season for shrimp trawling in Area G was open year round. A regulatory season was adopted by the Board for Area G in the spring of 1985, beginning June 1 and ending February 28.

Although surveys are not conducted in Area G, the stocks are not characterized by a dense distribution. Even in the very early years of this fishery, trawl cpue was never high, rarely approaching 1,000 pounds per hour. Logbook information collected over time indicates that fishermen in Area G must make long tows, often with extremely low catch results. Although pink shrimp constituted the bulk of the harvest, the bycatch of sidestripes was often large enough to economically justify the overall low catch per unit of effort.

1992-93 Season Summary

The Area G season opened by regulation on June 1, 1992 and closed by regulation on March 31, 1993. Since there were two or less vessels, Alaska statute requires that catch information remain confidential. However, the vast majority of the catch was sidestripe shrimp.

1993-94 Management Outlook

No trawl surveys are planned by the Department for any portion of Area G. The commercial fishery is therefore the sole source of information concerning stock status. The poor historical fishery performance in terms of catch per unit of effort would suggest low abundance levels of pink shrimp. Fishermen can sometimes overcome the low catch rates if they can locate and harvest a higher percentage of larger, more marketable shrimp, such as sidestripes, and subsequently receive a higher price for the product, an event which occurred on a small scale in 1988-89 and 1992-93.

Although it is difficult to broach the 1993-94 management without violating the rules of confidentiality, the department will use both historical catch and in-season logbook data to determine the harvest level of the fishery. It is unlikely that the harvest will be allowed to exceed the 1992-93 level unless a substantial difference in shrimp distribution can be documented via logs.

AREA H POT SHRIMP FISHERY

Introduction

Similar to trawl shrimp, the Cook Inlet Management Area is separated into two distinct registration areas for pot shrimp: Area H, consisting of the Southern, Kamishak, and Barren Islands Districts; and Area G, consisting of the Outer and Eastern Districts (Figure 2). Traditionally the major pot shrimp fishery had occurred in the Southern District.

Pot shrimp fishing in Kachemak Bay of the Southern District was primarily undertaken by small vessel fishermen that develop their own markets. The target species is the coonstripe shrimp, the most

abundant pot caught shrimp in Kachemak Bay. Spot shrimp (Pandalus platyceros) also occur in the bay but their contribution to the fishery is generally negligible. Each regulatory fishing season, which begins June 1 and ends March 31, is managed via three separate sub-seasons with appropriate guideline harvest levels set for each sub-season.

Prior to 1986, guideline harvest levels were determined by the Department's two annual pot shrimp surveys as well as by voluntary commercial fishery performance information. All pot shrimp surveys were subsequently eliminated in the Cook Inlet Area. Fishery performance data in the form of voluntary logbooks were collected consistently during 1986 and 1987 and were the sole criteria used to judge stock status during those years. This information, along with that from the most recent department trawl surveys and from local personal use fishermen, suggested that stocks of pot shrimp in Kachemak Bay continue to be depressed. Commercial catch figures show that the most recent harvests were well below those of the 1970's and early 1980's (Figure 15 and Appendix I). The fishery has been closed to commercial harvest since 1987.

1992-93 Season Summary

With no assessment surveys specifically directed at coonstripe shrimp in Kachemak Bay, and with no commercial pot shrimp fishery during 1991-92, the Department relied on data obtained in the spring 1992 trawl shrimp survey and voluntary information from personal use fishermen. For the third successive year, results from the spring trawl survey indicated a population estimate of less than 20,000 pounds of coonstripe shrimp for Kachemak Bay. These results showed a continued depressed stock when compared to historical catches that generated population estimates up to 1.0 million pounds. Furthermore, voluntary information offered by

personal use fishermen since 1988 has indicated very poor catches when compared to historical averages.

The aforementioned trawl survey and personal use fishery information demonstrated that the coonstripe stock in Kachemak Bay remained depressed, therefore the fishery was closed by emergency order for the entire 1992-93 season.

1993-94 Management Outlook

All information collected during 1992 indicated that stocks of pandalid shrimp continue to be depressed in Kachemak Bay. Prior to the scheduled June 1, 1993 regulatory opening, information from the May 1993 trawl shrimp survey and from any personal use shrimp fishermen will be reviewed. Should stock status be evaluated as depressed, the commercial fishery will not be opened. In that instance, the fishery would be closed for the entire fishing year in order to facilitate growth, recruitment and reproduction in the coonstripe shrimp stock.

AREA G POT SHRIMP FISHERY

Introduction

Area G, also known as Outer Cook Inlet, includes the Outer and Eastern Districts (Figure 2). Currently there are no closed seasons or biological regulations governing the pot shrimp fishery. The target species is the spot shrimp, but coonstripes are harvested to a lesser extent. Since 1977, catch and effort have remained low, never exceeding a reported annual harvest of 20,500 pounds whole weight caught by 8 participating vessels in 1989 (Figure 16 and Appendix J). Despite the extensive coastal area,

historical information collected from this fishery suggests that the measurable stocks of spot and coonstripe shrimp occur within some (but not all) bays and are of limited abundance.

1992 Season Summary

The commercial season was open by regulation for the entire 1992 calendar year. Three vessels harvested a total of 2,804 pounds of shrimp. Catch by species was: spots - 1,610 pounds, coonstripe - 786 pounds and pinks - 408 pounds. Fishing occurred from February into September. The bulk of the harvest was landed in Seward and served Kenai Peninsula markets. Catch reporting cannot be documented by district (Outer and Eastern) since two or less fishermen participated in each district.

1993 Management Outlook

Collection and review of fish ticket information is the primary form of management strategy employed for Area G pot shrimp. In addition, voluntary logbook information has been provided by a few fishermen throughout some of the historical seasons and compared to that of prior years. The information collected during 1992 gave no indication to expect either harvest or effort to increase in the near future.

SCALLOP FISHERY

Introduction

The commercial scallop fishery in the Cook Inlet Management Area (H) began in 1983 although sporadic interest had occurred prior to

that time. The Alaska Board of Fisheries responded to a public proposal in 1983 by directing the department to allow restricted exploratory fisheries in 1983 and 1984. These initial fisheries were characterized by low effort due to severe permit restrictions when compared with traditional scallop fisheries both inside and outside Alaska. The most important restrictions were:

1) Legal gear limited to a six-foot wide dredge with minimum ring size of four inches inside diameter.

2) Only one unit of gear allowed on board at any one time.

3) Mandatory log book completion.

4) Contact with the Homer office prior to and at the completion of each trip.

5) An agreement to carry department observers on board if requested.

The target species of the fishery is the Pacific weathervane scallop. Except for some brief exploratory fishing in the Kamishak District in 1984 and in the Outer District in 1987, a single bed of scallops near Augustine Island in the Kamishak District has sustained virtually the entire harvest since the fishery began in 1983. The department conducted an assessment survey in August, 1984, using the state research vessel Pandalus, to better define the extent of this particular bed and to aid in establishing appropriate harvest levels.

Based on information from the 1984 survey as well as data from the initial fisheries, the Board of Fisheries adopted regulations for scallops in Cook Inlet in 1985. These regulations included a season in the Kamishak District from August 15 through October 31, a guideline harvest level of 10,000 to 20,000 pounds of shucked

meats, and the restrictions mentioned previously. The Southern District was not opened to scallop fishing in order to protect crab stocks, while the Outer and Eastern Districts were opened year round to encourage exploratory fishing. Commercial fishery performance has been used inseason to adjust guideline harvest levels. Harvest and effort peaked in this fishery during 1986 when 3 vessels took slightly more than 15,000 pounds of shucked meats (Figure 17 and Appendix K).

At the start of the 1987 fishery, several experienced participants demonstrated extremely poor fishery performance during their first trips to the traditional Kamishak bed. Realizing that this bed is limited in size, and that the recovery rate for heavily exploited scallop stocks in Alaska is slow, the department closed the Kamishak District scallop fishery less than one week after it opened. The significant reduction in cpue demonstrated in the 1987 fishery occurred over only one year's time and appears to have been the result of illegal fishing activity which probably occurred during the fall months of 1986 and winter months of 1987. In an attempt to address the potential problem of illegal fishing, the department required scallop vessels transitting the Cook Inlet area to be inspected prior to and immediately after entering and leaving the area. This requirement was implemented too late, however, since the majority of illegal activity had already occurred.

No commercial effort has occurred in Cook Inlet from 1988 through 1992. Although some local fishermen have expressed interest in fishing during these years, the potential of a fishery closure after one trip did not warrant the investment in time and effort since the department told these fishermen that their catch data would be used to justify continuance of the fishery. Data required of the fishermen would have included logbooks, shell samples and interviews as well as potential for observers.

1992 Season Summary

Scallop regulations and harvest guidelines adopted in 1985 remained in effect through 1992, with the exception that the guideline harvest range in the Kamishak District was reduced to a range of 0 to 20,000 pounds. As has been the case during recent years, the department intended to closely monitor fishery performance within this district in order to justify continued fishing or closure of the fishery. No permits were requested for any district in the Cook Inlet area in 1992, subsequently no effort or harvest occurred.

Although scallop fishing was on an upswing in the Gulf of Alaska in general, no scallopers requested permits to fish the open waters of the Gulf of Alaska portion of the Cook Inlet Management Area which essentially includes the area between Cape Fairfield and Cape Douglas. Likely this area had been explored in prior years with negative results.

1993 Management Outlook

Without a commercial fishery and cpue data, the Department has no means by which to judge the health of the scallop resource in the Kamishak District. Therefore, the department will allow the 1993 scallop season to open by regulation on August 15 with a 0 to 20,000 pound guideline harvest level. Vessel logbooks and skipper interviews will be reviewed in season to determine if the fishery performance justifies continued fishing. Samples of scallops from the fishery will also be analyzed and compared for size and age to those from earlier fisheries. A season closure will occur if catch data indicate that the stock remains depressed. Scallop vessel effort is once again expected to be low in all districts of the Cook Inlet area during the 1993 season.

Although the fishery in the Outer and Eastern Districts remains open on a year round basis, significant effort is not likely to occur since an absence of historical catch indicates that scallop abundance is low. It is probable that the small but mobile Gulf of Alaska scallop vessels have sampled the Outer and Eastern Districts in past years. A rise in exvessel value may renew interest in these districts.

HARDSHELL CLAMS AND MUSSELS

Introduction

Commercial hardshell clam and mussel harvests in the Cook Inlet Management Area were not well documented prior to 1986. The generic term, hardshell clams, generally refers to littleneck and butter clams. Before harvesting clams or mussels for human consumption, an area must be certified for water quality by the Alaska Department of Environmental Conservation (ADEC) in accordance with the National Shellfish Sanitation Program (NSSP).

A limited amount of hardshell clams were harvested in Chinitna Bay in 1985 after the area was certified for lot sampling by ADEC. Lot sampling is a method by which ADEC checks the clams for paralytic shellfish poisoning (PSP). In 1986 ADEC permitted the use of lot sampling for Chugachik Island (near Bear Cove) in Kachemak Bay. Through 1989, Chugachik Island, Halibut Cove Lagoon, Kasitsna Bay, and Jakalof Bay, all in the Southern District, were certified for lot sampling. At the end of 1989 Tutka Bay was certified by ADEC.

From 1986 through 1992, the total annual harvest of hardshell clams has ranged from 14,500 pounds to 54,600 pounds. In 1989 the bulk of the clam harvest went to sea otter food in a rehabilitation project resulting from the Exxon Valdez oil spill. In the

remaining years the majority of the harvest was Pacific littleneck clams (Protothaca staminea) that went to Kenai Peninsula and Anchorage markets. Effort has ranged from 2 to 21 hand diggers (Figure 18 and Appendix L).

Only 102 pounds of blue mussels were harvested commercially prior to 1989. In 1989 the catch rose to over 167,000 pounds due to utilization of the product for otter food in an otter rehabilitation project which was a result of the Exxon Valdez oil spill (Appendix M).

Currently there are no closed season or closed area regulations for harvesting with forks and shovels. Minimum sizes were established by the Alaska Board of Fisheries in the spring of 1990 for Pacific little neck clams at 1.5 inches (38.1 mm) and butter clams (Saxidomus giganteus) at 2.5 inches (63.5 mm). A Commissioner's permit is required to use hydraulic diggers. Currently market conditions seem to be the dominant factor affecting the harvest of clams and mussels in Cook Inlet, although this should not be interpreted as indicating that a large abundance of clams are available for harvest.

The department began a hardshell clam assessment program on two beaches in Jakalof Bay during 1989. The program was intended to evaluate the populations of clams on these beaches and monitor them over time in an attempt to determine the effects of both commercial and personal use harvesting. Subsequently the department began a limited test dig program at Chugachik Island. These data are currently awaiting final analysis.

1992 Season Summary

Total 1992 hardshell clam harvest was 54,631 pounds hand-dug by 21 permit holders. Littlenecks comprised 100% of the catch (Table 3).

Harvesting occurred in every month except December with 87 percent of the catch coming from the months of March through August. Fifty one percent of the catch came from the Jakalof/Tutka Bay area while the remaining 49 % came from Chugachik Island.

Blue mussel harvest for 1992 totalled 2,501 pounds taken by three diggers. The entire catch came from the Tutka, Jakalof and Kasitsna Bay area.

1993 Management Outlook

Market demand, ADEC beach certification and abundance will all play a role in determining the 1993 Cook Inlet clam harvest. The majority, if not all, of the wild stock clam and mussel harvests from Cook Inlet have traditionally been sold within Alaska, primarily in the Anchorage area. High labor and transportation costs along with the inability to guarantee large volume, which appears to be a requirement from most lower 48 wholesalers, seem to prevent Alaskan products from competing effectively with similar products out of the state.

The department is becoming increasingly concerned with the ability of the resource to sustain expanding commercial and recreational pressure. Although there are minimum sizes applicable to the commercial fishery, they only guarantee dependence on recruitment into the legal segment of the stock. If fishing pressure and subsequently harvest rates continue to increase, the fishery may be dependant on annual recruitment, an event that can be highly variable for molluscs in Alaska.

Furthermore, the recreational user is becoming increasingly concerned and vocal about the escalation of commercial utilization of the littleneck clams and to a lesser extent the blue mussel resource. Not only is the recreational clam harvester interested

in development in the commercial fishery, the public utilizing Kachemak Bay State Park are also worried about a decrease in the quality of their recreational opportunity.

In response to these concerns the department will develop a management plan for review by the Board of Fisheries during the 1993-94 cycle. Key to the management plan will be an alternate year commercial harvest strategy which basically will open half of the certified beaches on one year, and the other half during the following year. Other features of the plan will include the following commercial restrictions:

1) areas of high recreational value will be closed,

2) weekends will be closed from May 15 through September 15, and

3) a registration deadline of April 1.

The plan also includes two options for the Board to consider which effect the recreational users:

1) a minimum legal size for littleneck and butter clams of 1.5 and 2.5 inches, respectively (both of these are the same as the commercial size limits), and

2) a bag and possession limit of 1,000 littleneck clams and 700 butter clams.

During 1993 the department will continue to monitor the condition of the littleneck clam stocks via surveys at Jakalof and Chugachik, fish tickets and fishermen interviews. An substantive indication of decline may justify closure of specific beaches by emergency order.

RAZOR CLAMS

Introduction

Razor clams are present in many areas of Cook Inlet with particularly dense concentrations occurring near Polly Creek on the western shore of the Central District and from Clam Gulch to Ninilchik on the eastern shore of this district (Figure 1). The eastern shoreline has been set aside exclusively for sport harvest since 1959. All commercial harvests since that time have come from the west shore, principally from the Polly Creek/Crescent River beach, the only area in Cook Inlet certified by the Alaska Department of Environmental Conservation for human consumption harvest. The harvest of razor clams from this certified beach for any purpose other than human consumption is specifically prohibited by regulation. Permits issued for this area allow a maximum of ten percent incidental bait harvest, which accounts for those clams which are broken and cannot be sold for human consumption.

No razor clam harvest limits are in place for any area, but in the spring of 1990 the Alaska Board of Fisheries adopted a regulation requiring a four and one-half inch (114 mm) minimum size for razor clams. At this same meeting, the Board also prohibited the use of hydraulic diggers (dredges) for razor clams in the Cook Inlet area. Historically the majority of razor clams harvested in Cook Inlet have been hand-dug. Numerous attempts have been made in Cook Inlet to develop a dredge to efficiently and economically harvest this species with minimal incidental damage to non-target animals, but none have been considered successful.

Since 1919, commercial razor clam harvest levels in Cook Inlet have fluctuated from no fishery for as many as eight consecutive years to production in excess of half a million pounds (live weight) in 1922 (Figure 19 and Appendix N). The sporadic nature of the

fishery has been a function of effort and market opportunities rather than limited availability of the resource.

1992 Season Summary

The commercial razor clam fishery in Upper Cook Inlet has no closed season and no overall harvest limits. The 1992 fishery began in late May and the last reported deliveries were made on August 31. The season's harvest of 296,727 pounds was taken primarily from the Polly Creek area. A total of 32 diggers made 1,550 landings.

The above razor clam report has been provided by the Commercial Fisheries management staff, ADF&G, Soldotna.

OCTOPUS

Introduction

The harvest of octopus in the Cook Inlet area has historically occurred incidentally to other directed fisheries such as the commercial Tanner crab, groundfish pot and trawl fisheries. Cook Inlet octopus harvest records are currently available only since 1983 (Figure 20 and Appendix O). In the past five years increased interest has occurred in directing effort specifically towards octopus. Many different gear types have been tried but the resultant harvest has been negligible. Most of the effort has focused on the Southern District (Kachemak Bay).

There are no closed seasons or size limits on octopus at the present time, but a permit is required prior to fishing a given registration area. Cook Inlet permit restrictions include short permit duration (typically one to four months), strict reporting

requirements, and a detailed description of gear to be utilized. This last requirement prevents gear legally defined as king, Tanner, Dungeness or shrimp pots from being used to capture octopus in order to reduce or eliminate the probability of by-catch of those species.

1992 Season Summary

The total catch was 7,447 pounds taken by 22 fishermen. There was no catch resulting from directed effort towards octopus in 1992. The majority of the harvest was bycatch of the groundfish fisheries with a small segment coming from pot shrimp fishermen.

1993 Management Outlook

The high prices paid for octopus in recent years, publications promoting the potential octopus fishery in Alaska, and the attraction of an alternative fishery are all expected to produce a continued interest in octopus as a target species during 1993. The extent of this resource in Cook Inlet outside the Southern District is undetermined and could ultimately affect any directed fishery. In the absence of a demonstrably effective method of harvest, the Cook Inlet octopus catch is not expected to increase significantly in 1993 unless it is a result of bycatch from a groundfish pot or trawl fishery.

SEA URCHINS

Introduction

Sea urchins, and commercial fisheries for them, occur along the U.S. and Canadian Pacific coast from California to Alaska as well as the Maritime Provinces of Eastern Canada and the State of Maine. The green sea urchin, the smallest of the commercial urchins, is the only urchin species in Cook Inlet which occurs in quantities sufficient to support commercial effort. Although red urchins (Strongylocentrotus franciscanus) do occur in small, isolated beds within the management area, their abundance and distribution are insufficient to support any form of commercial effort. Green urchins are harvested solely for their gonads, considered a delicacy in the Orient.

No commercial harvest for this species occurred in Cook Inlet prior to 1987. From 1988 to 1992 the harvest has ranged from 224 to 20,445 pounds of whole urchins. The greatest effort to this point was seven divers in 1992 (Appendix P).

By regulation each fisherman must obtain a Commissioner's Permit prior to harvesting urchins commercially. An additional regulatory requirement limits allowable methods of harvest to hand picking or the use of an abalone iron, both intended to minimize disruption of the substrate. Utilizing available published information on this species as well as the framework of current management practices for the red urchin in southeast Alaska, the department established the following permit restrictions:

1) A minimum legal size of 2.0 inches (50.8 mm) measured across the test and not including spines. The minimum size is intended to protect the broodstock and sufficient

numbers of large urchins, which in turn provide a canopy that helps protect the smaller urchins.

2) Permit duration from mid-September through mid-December, the time period when the gonads are fullest and therefore of highest market quality. The permit period may be extended past mid-December if recovery data is made available to the department.

3) Area of harvest in the Southern District alternated each year between that portion of Kachemak Bay east of Homer Spit and that portion west of the Spit, in order to reduce the potential of overharvest in any one given area.

The market demand for urchin gonads appears to be substantial as evidenced by the amount of interest generated towards the harvest of this species. Most of these fishermen, however, assume that the urchins which occur in Cook Inlet are similar to those species which occur further south. The green urchin, which is smaller in size, must be harvested in larger quantities to be economically profitable. Potential harvesters in the Cook Inlet area have found, through commercial and personal use investigations (collecting with a sport fishing license), that the numbers of marketable urchins have not justified the investment in time and money necessary to establish a large economical commercial venture.

Virtually all the fishing effort and all the reported harvest has come from Kachemak Bay. To this point, logistics have played a significant role in determining where urchin harvest occurs. Since the season is during the fall/winter storm months, harvesting among the bays of the outer coast presents not only problems for the divers themselves, but also difficulty getting the urchins to market regularly. Timing of delivery to the processor is important

since the buyers of the urchins are very particular regarding both recovery percentage and overall quality.

1992-93 Season Summary

Seven divers harvested 6,119 pounds of whole green urchins during the months of October and December, 1992 and January, 1993. The entire Southern District was opened except for China Poot Bay. The strategy was employed in order to encourage exploration and effort in waters other than China Poot which has sustained most of the historical harvest. Most of the effort occurred in October, but the results were not encouraging. Although green urchins are present in many locations within Kachemak Bay, apparently only a few specific areas have urchins large enough to attract the commercial market. Two divers continued limited efforts in the months of December and January. The season closed (permits were not reissued) on January 31 since the urchins were approaching the spawning season.

There were no permits issued or any documented harvest for any portion of the Cook Inlet Management Area outside of the Southern District.

1993-94 Management Outlook

As long as a strong market exists for urchin gonads, the harvest of these invertebrates is expected to generate a considerable amount of interest. The waters east of Homer Spit, including China Poot Bay, will be opend by permit to commercial urchin fishing. It is likely that China Poot will generate the majority of the catch and effort.

All other permit restrictions in Cook Inlet will remain in effect for 1993. Size limit modifications and/or season extensions will be determined, as in the past, on a case by case basis using the best available information.

It must be noted that sea urchin growth rates are highly variable on an annual basis. Should the stocks experience good growth rates during several successive years, an expansion of the commercial fishery remains a distinct possibility. However, present stock conditions suggest that effort will probably remain low in the near term.

SEA CUCUMBERS

Introduction

Prior to 1990, the Cook Inlet Management Area had no documented harvest history of the sea cucumber (Parastichopus californicus). In 1990 two divers harvested cucumbers. Since there were two or less participants, the catch data are confidential. The approximate harvest, however, was 20,000 to 25,000 pounds of whole sea cucumbers.

No information is available regarding the extent, distribution, or life history of this species in the management area. No regulations or harvest guidelines specific to the commercial harvest of cucumbers are in effect for Cook Inlet. In the absence of biological information, any commercial fishery under consideration would be on an experimental basis only in order to collect fundamental information and establish a preliminary data base on this species in Cook Inlet. Total effort would be severely restricted by permit.

Although sea cucumbers have been reported in Cook Inlet, especially within the Southern District (Kachemak Bay), the limited commercial harvest as well as exploratory effort indicate that the stocks are neither dense nor extensive. There is another genus of sea cucumber, Cucumaria sp., which exists in noticable abundance in portions of the Southern District. This animal however is of no commercial value.

1992 Season

Although the department received numerous inquiries regarding sea cucumbers, there was no commercial harvest during 1992. In each instance, the staff would suggest that prospective commercial divers first obtain a sport fishing license and then do some exploratory diving before entering a full scale commercial venture.

1993 Management Outlook

Based on recent exploratory dives by experienced divers, it does not appear that a significant fishery for sea cucumbers will occur in 1993. Limited permits will be issued if there is any commercial interest.

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Carls, M.G. and C.E. O'Clair. 1989. Influence of cold air exposures on ovigerous red king crab (Paralithodes camtschaticus) and Tanner crabs (Chionecetes bairdi) and their offspring. Proc. Int. Symp. King and Tanner Crabs. pp. 329-343.

EEO STATEMENT

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O.E.O.
U.S. Department of Interior
Washington, DC 20240

Table 1. Numeric listing of shellfish emergency orders, including personal use, issued for the Cook Inlet Management Area for the fisheries listed in the 1992-93 Cook Inlet Area Shellfish Annual Management Report.

Emergency Order Number	Effective Date	Explanation
2-S-H-01 to 04-92		Listed in 1991-92 Annual Management Report.
2-S-H-05-92	06/01/92	Closed the commercial Dungeness crab fishery in the Southern District.
2-S-H-06-92	06/01/92	Closed the commercial pot shrimp fishery in Kachemak Bay.
2-S-H-07-92	07/01/92	Closed the commercial trawl shrimp fishery in Kachemak Bay.
2-S-H-08-92	09/01/92	Closed the commercial king crab fishery in the Cook Inlet Management Area.
2-S-H-01-93	01/15/93	Closed the commercial Tanner crab fishery in the Kamishak Bay, Barren Islands, Central, Outer and Eastern Districts.
2-S-H-02-93	01/16/93	Closed the commercial Tanner crab fishery in the Southern District at 12:00 noon.
2-PU-H-01-92	09/01/92	Closed the personal use fishery for king crabs in the Cook Inlet Management Area.
2-PU-H-02-92	01/01/93	Closed the personal use fishery for Tanner crabs in the Southern District and reopened it commensurate with the opening of the comercial Tanner crab season until 03/15/93 when it closes for the entire management area.
2-PU-H-03-92	01/01/93	Closed the personal use fishery for Dungeness crabs in Kachemak Bay and reopened it commensurate with the opening of the commercial Tanner crab season until 03/15/93 when it closes for the entire management area.

Table 2. Tanner crab (Chionecetes bairdi) catch by district and statistical sub-area, Cook Inlet Management Area, 1993 season.

District	Stat. sub-area	Vessels	Landings	Crabs	Pounds	Avg. Weight	Pot Lifts	Average no. crabs per pot
Southern	241-11	63	75	98,817	251,009	2.54	4,632	21.3
	241-12	57	71	82,778	210,265	2.54	3,841	21.5
	241-13	6	8	4,760	12,093	2.54	365	13.0
	241-15	29	43	22,514	57,184	2.54	1,742	12.8
	241-16	2	2	1,359	3,452	2.54	80	17.0
Southern District Totals		136	188	210,228	534,003	2.54	10,660	19.7

Table 3. Hardshell clam harvest by statistical area, Cook Inlet Management Area, 1992.

District	Stat. sub-area	No. permits	No. landings	Butter	Little-neck	Total hardshell
Southern	241-14	12	43	0	26,971	26,971
	241-16	16	77	0	27,660	27,660
	Total	21	117	0	54,631	54,631

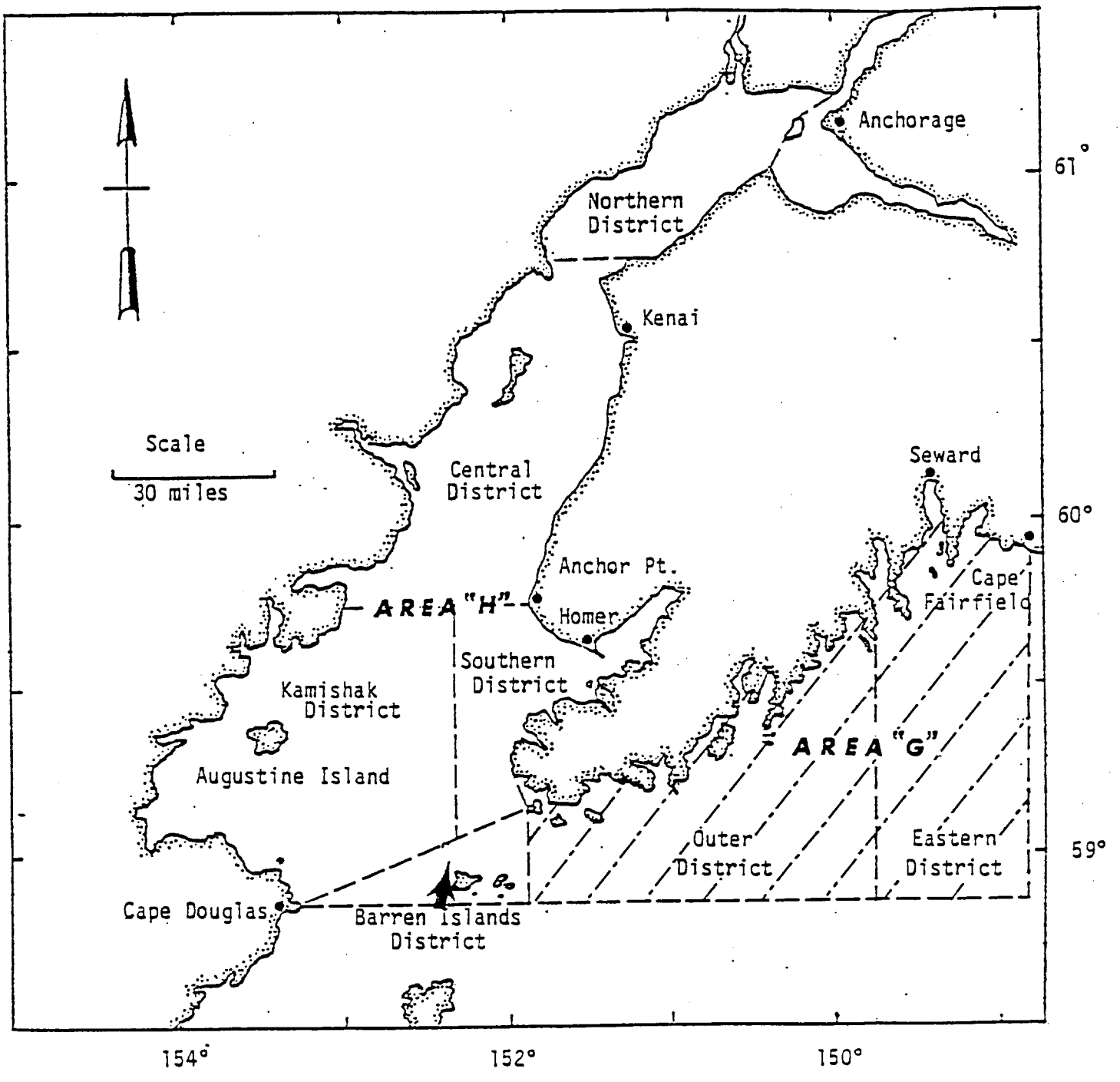

Figure 1. Cook Inlet Area ("H") and Outer Cook Inlet Area ("G") district location chart for shrimp management.

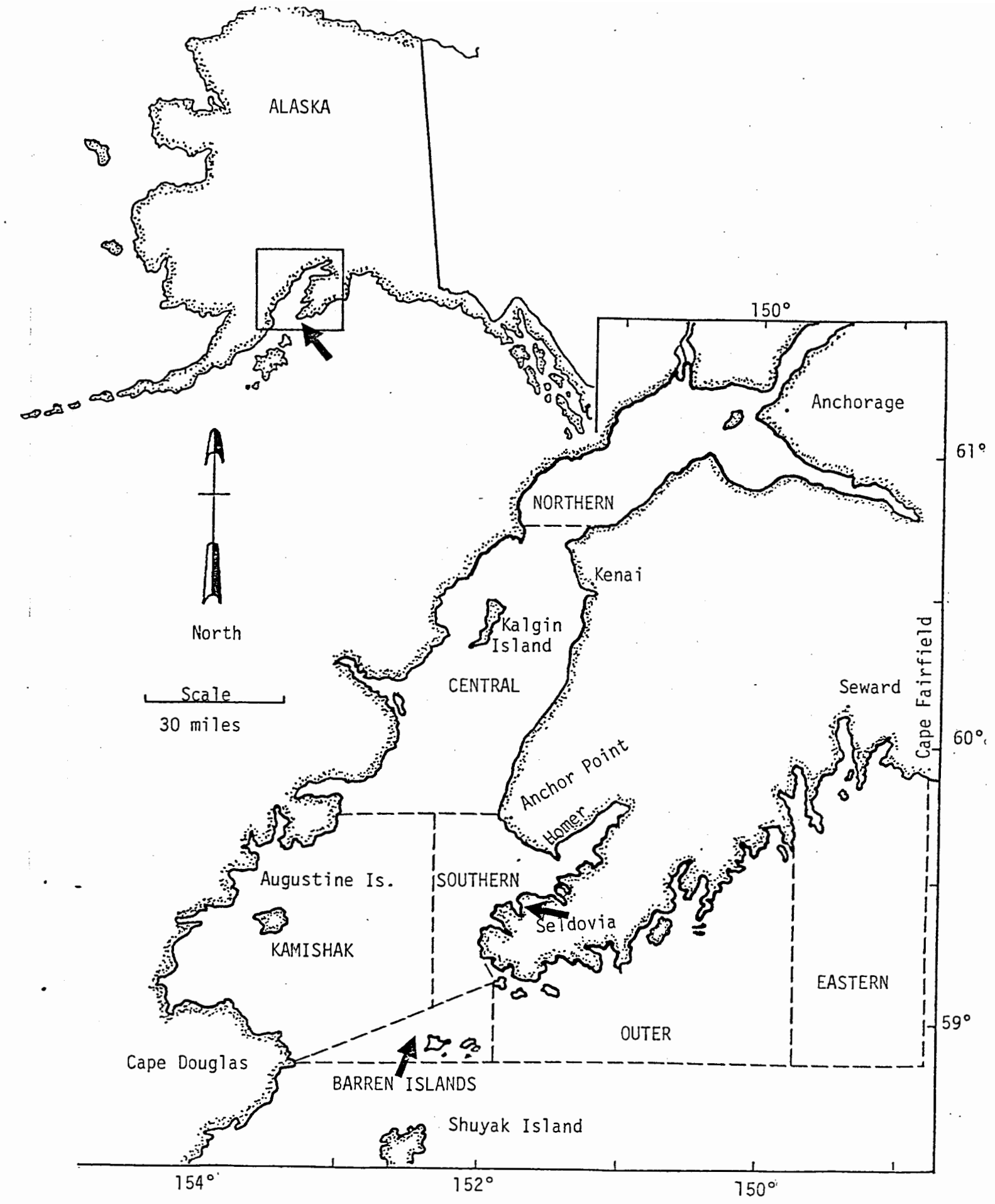

Figure 2. Cook Inlet area district location chart.

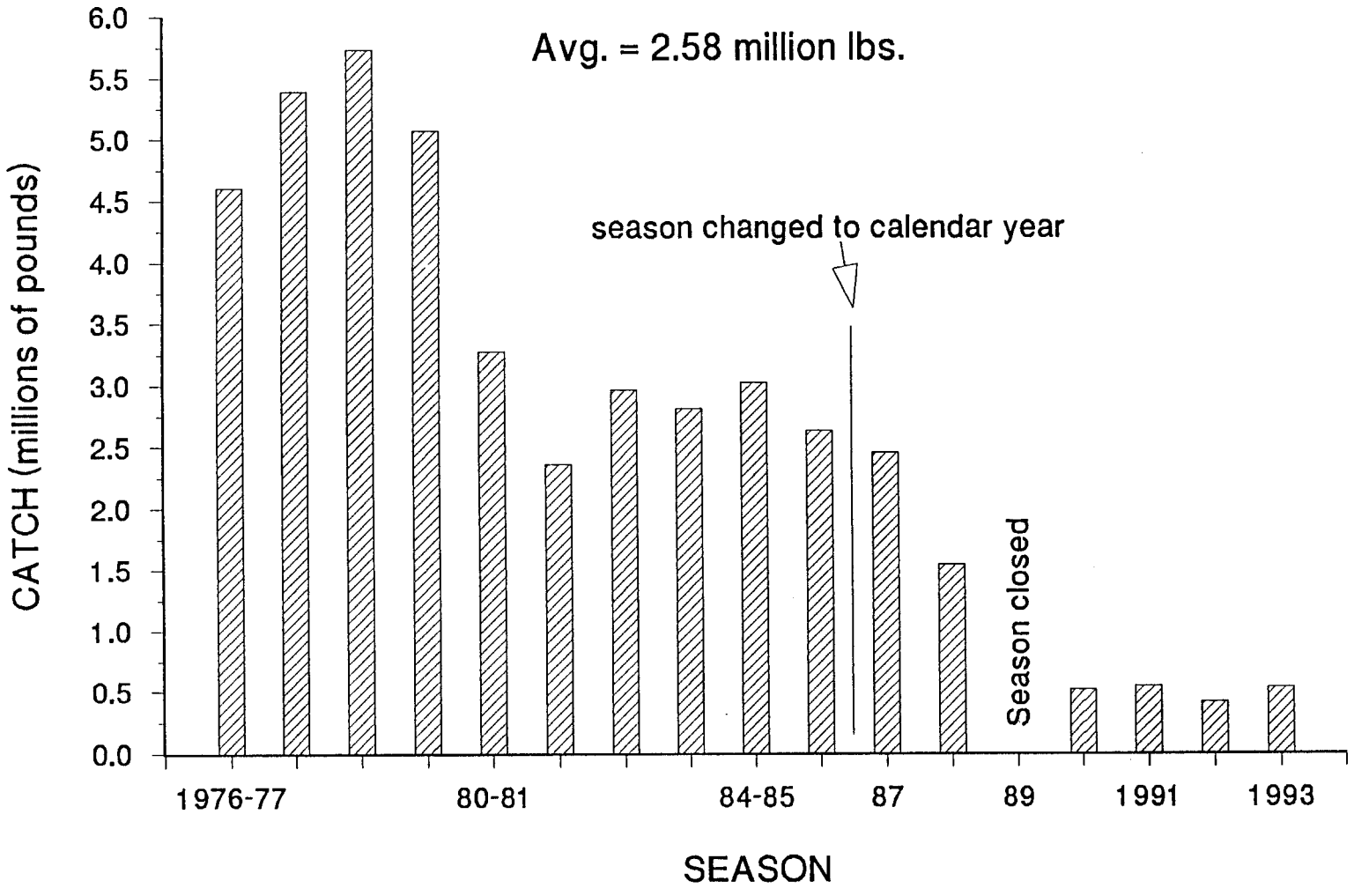

Figure 3. Tanner crab catch by season, Cook Inlet Mgt. Area, 1976 - 1993.

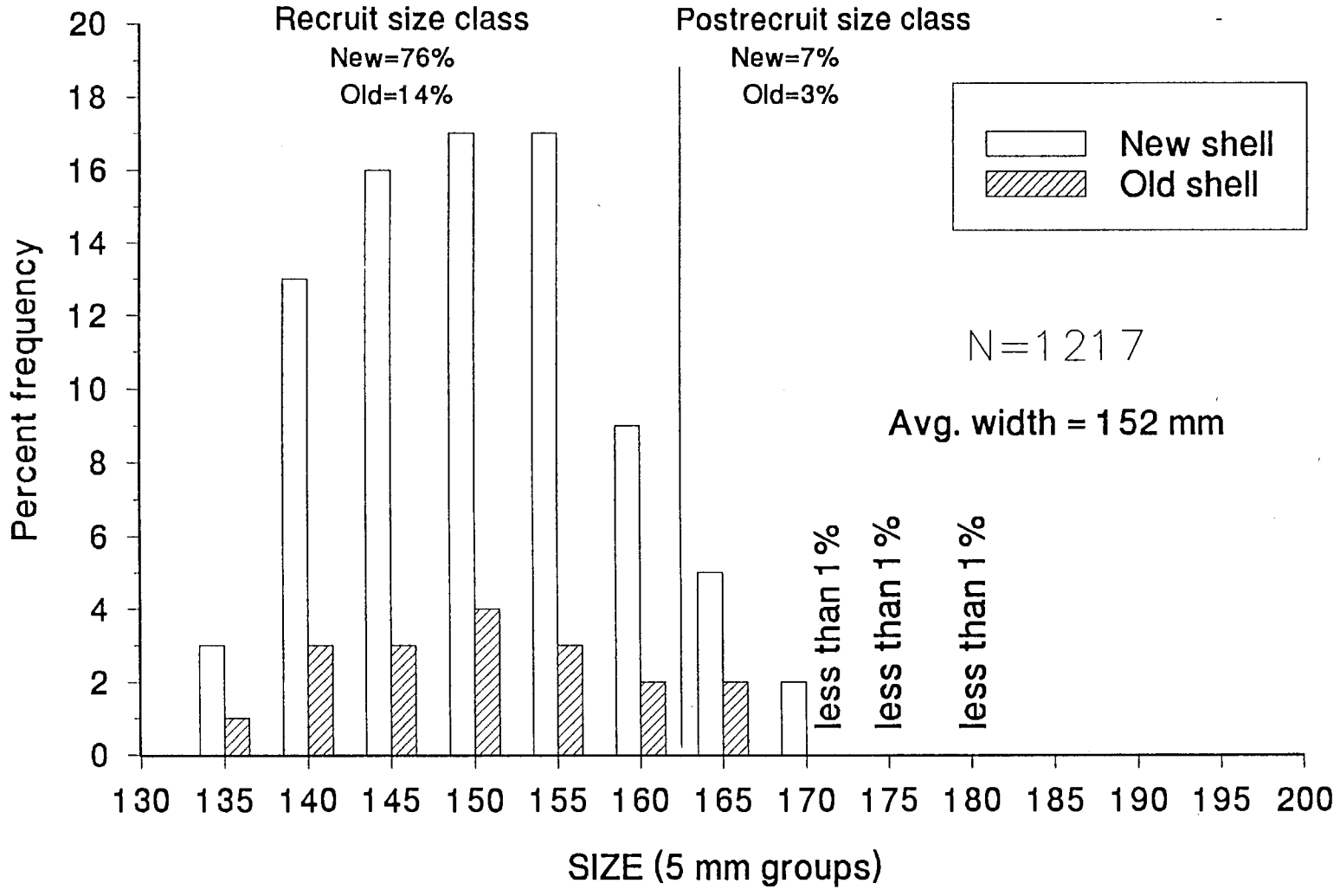

Figure 4. Commercial catch size freq., 1993 Southern Distr., Tanner crabfishery.

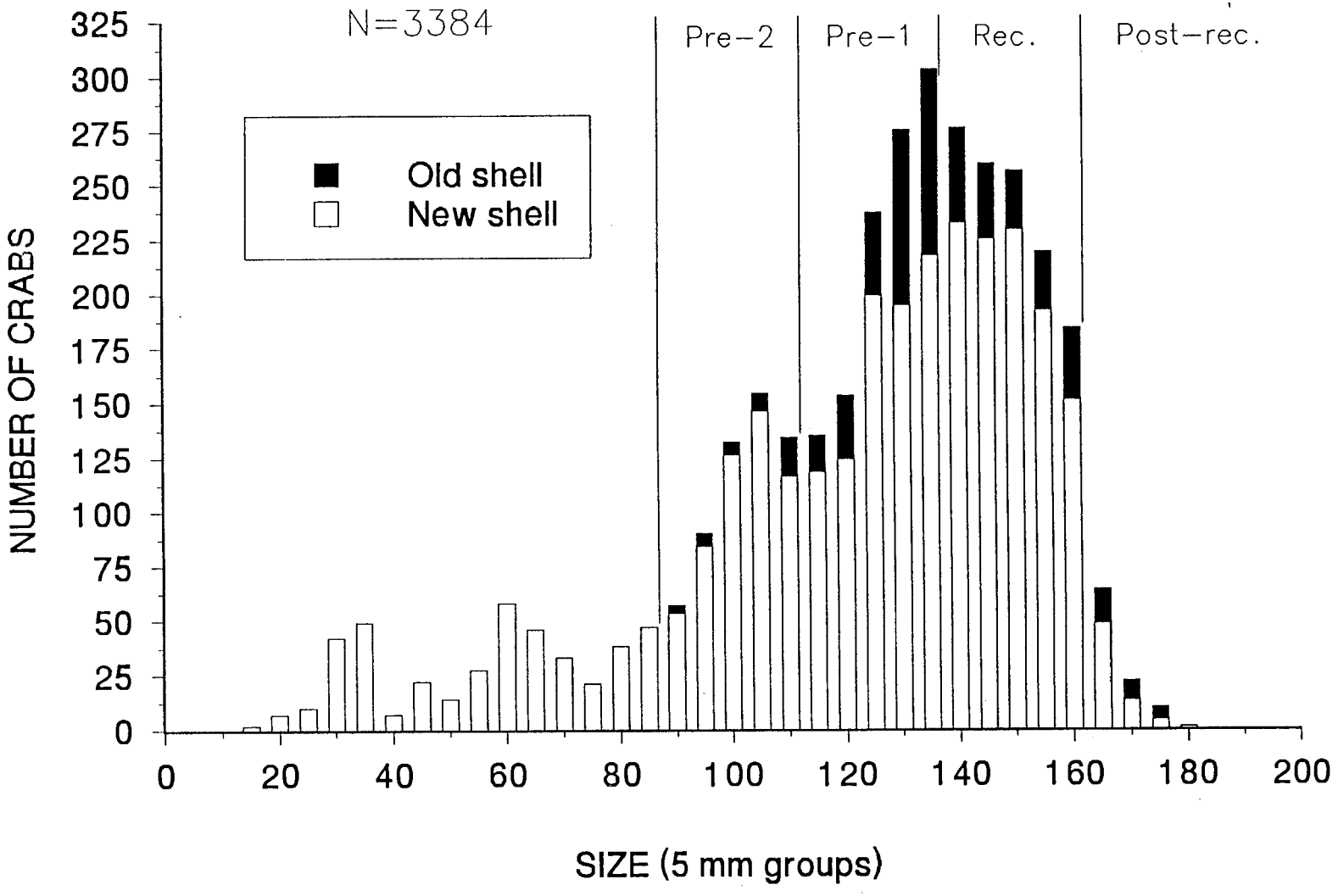

Figure 5. Male Tanner crab catch, Southern Distr., 1992 Cook Inlet trawl survey.

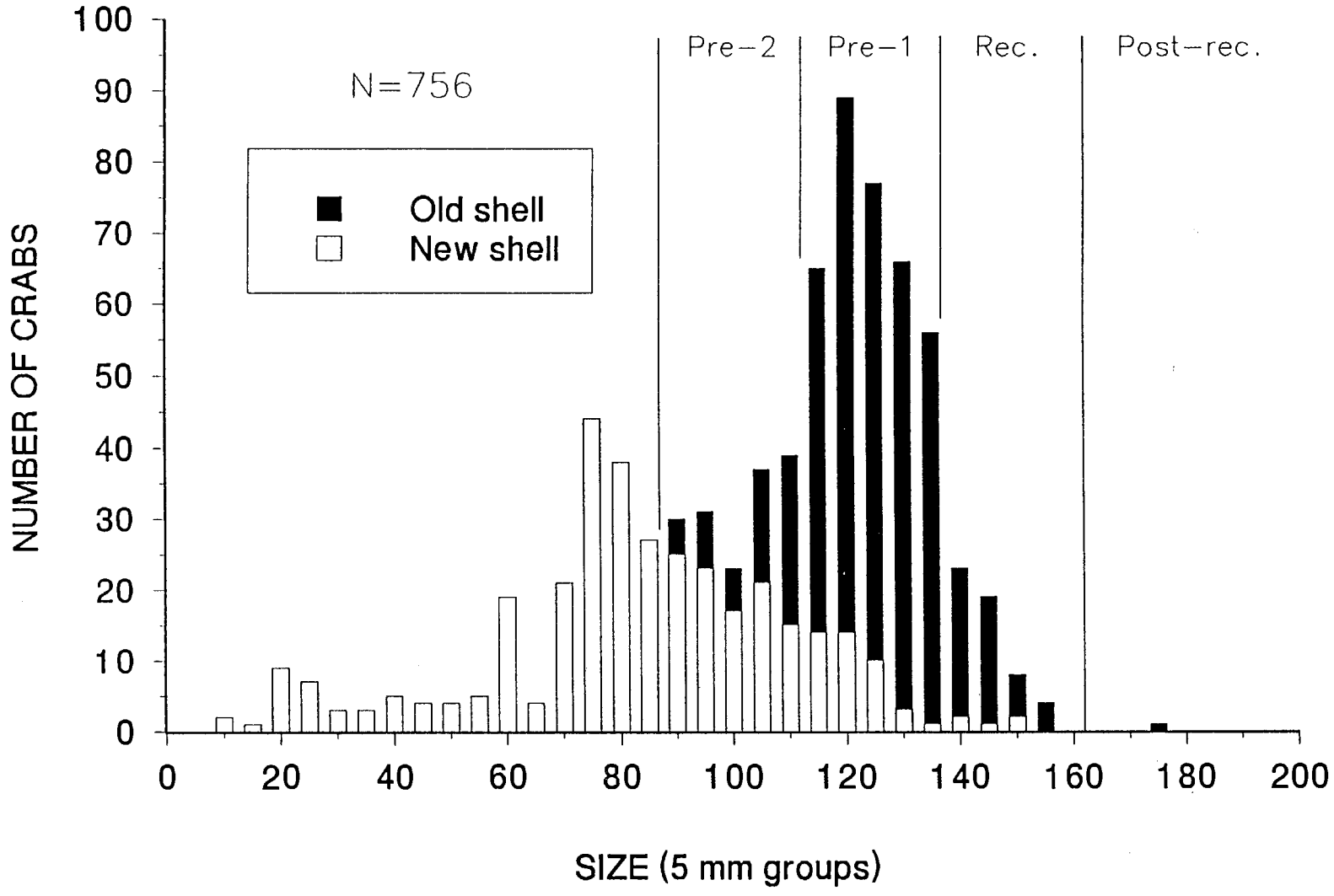

Figure 6. Male Tanner crab catch, Kamishak District, 1992 Cook Inlet trawl survey.

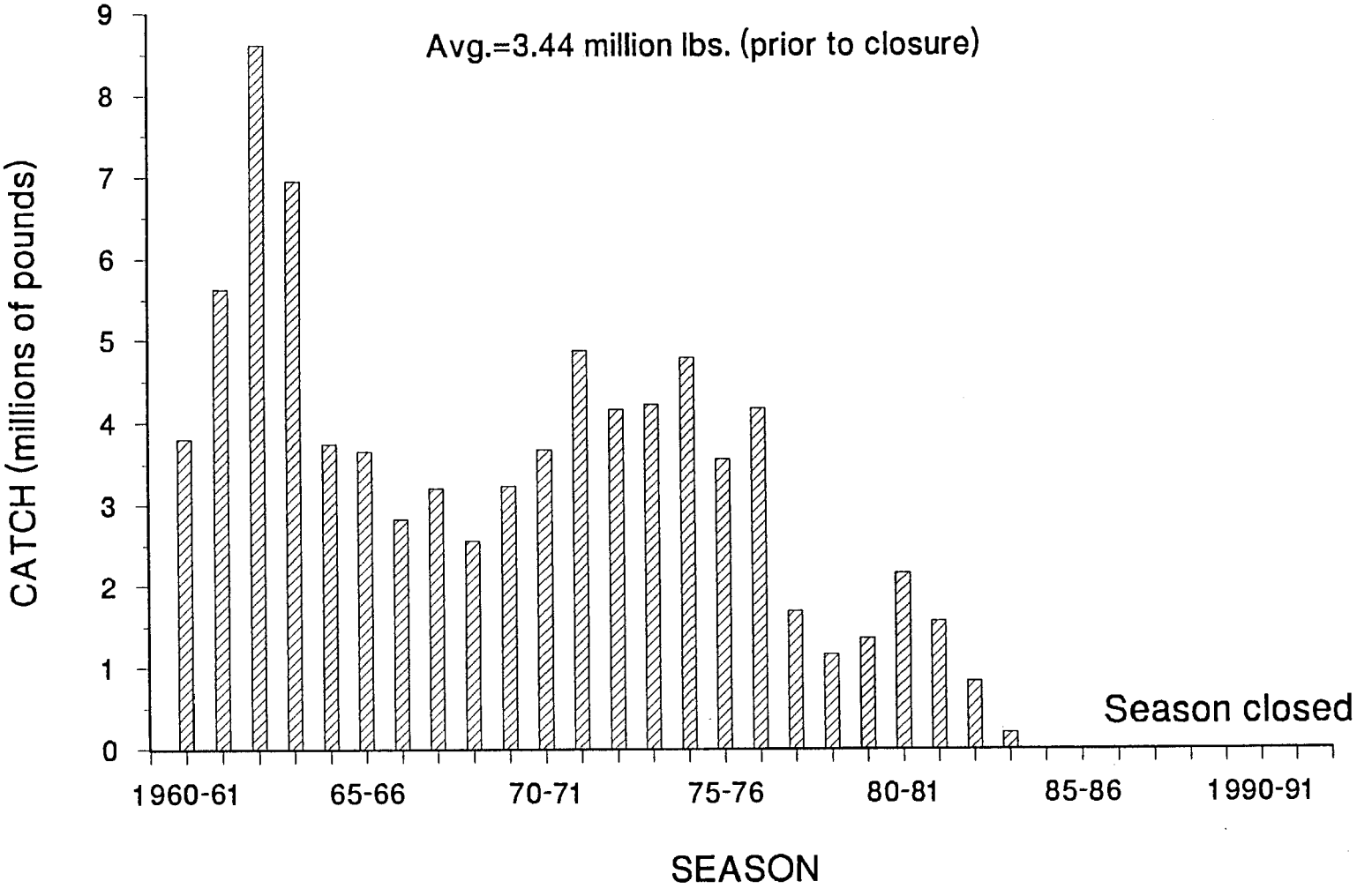

Figure 7. King crab catch by season, Cook Inlet Mgt. Area, 1960 - 1993.

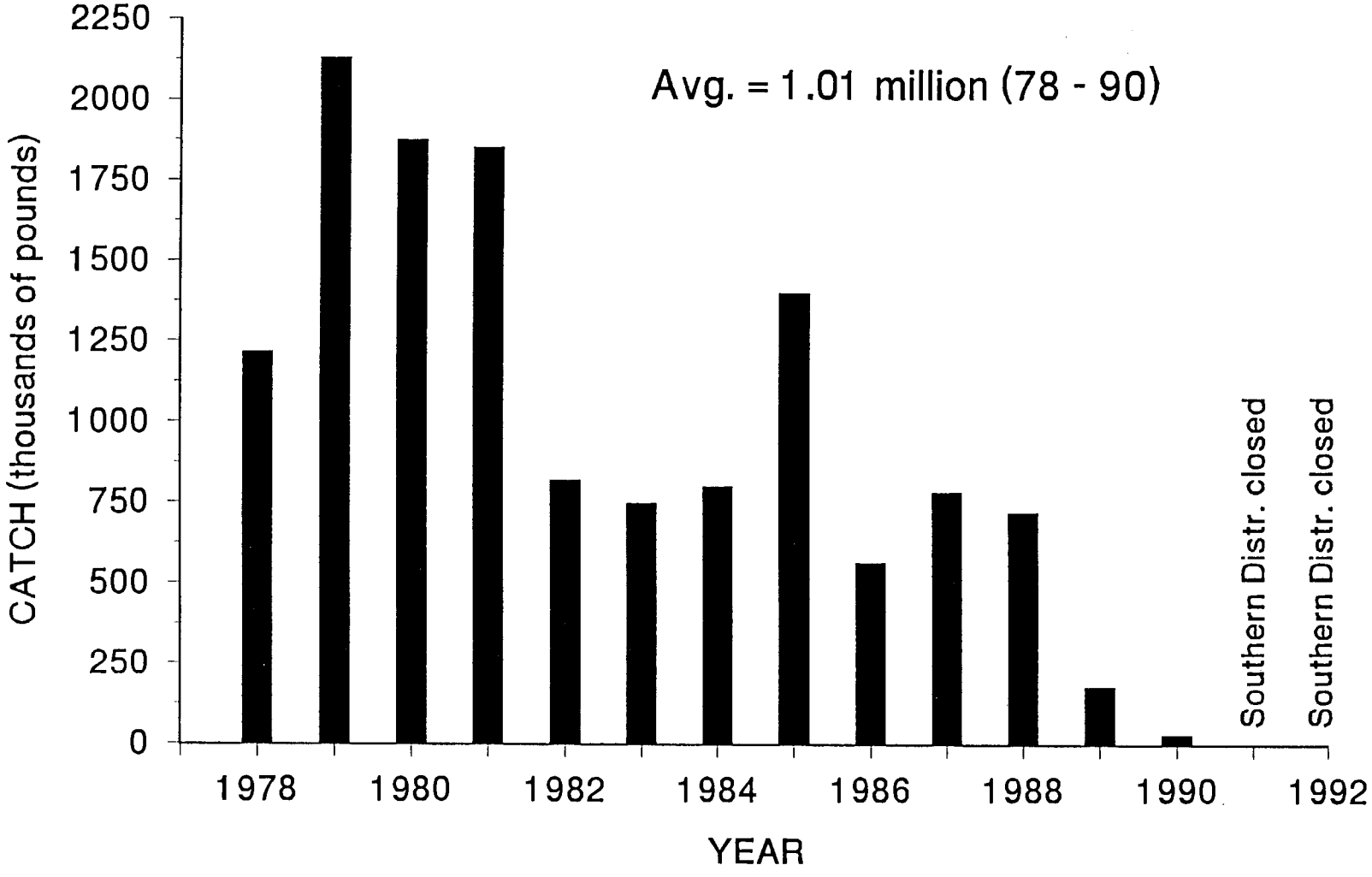

Figure 8. Dungeness crab catch by year, Cook Inlet Mgt. Area, 1978 - 1992

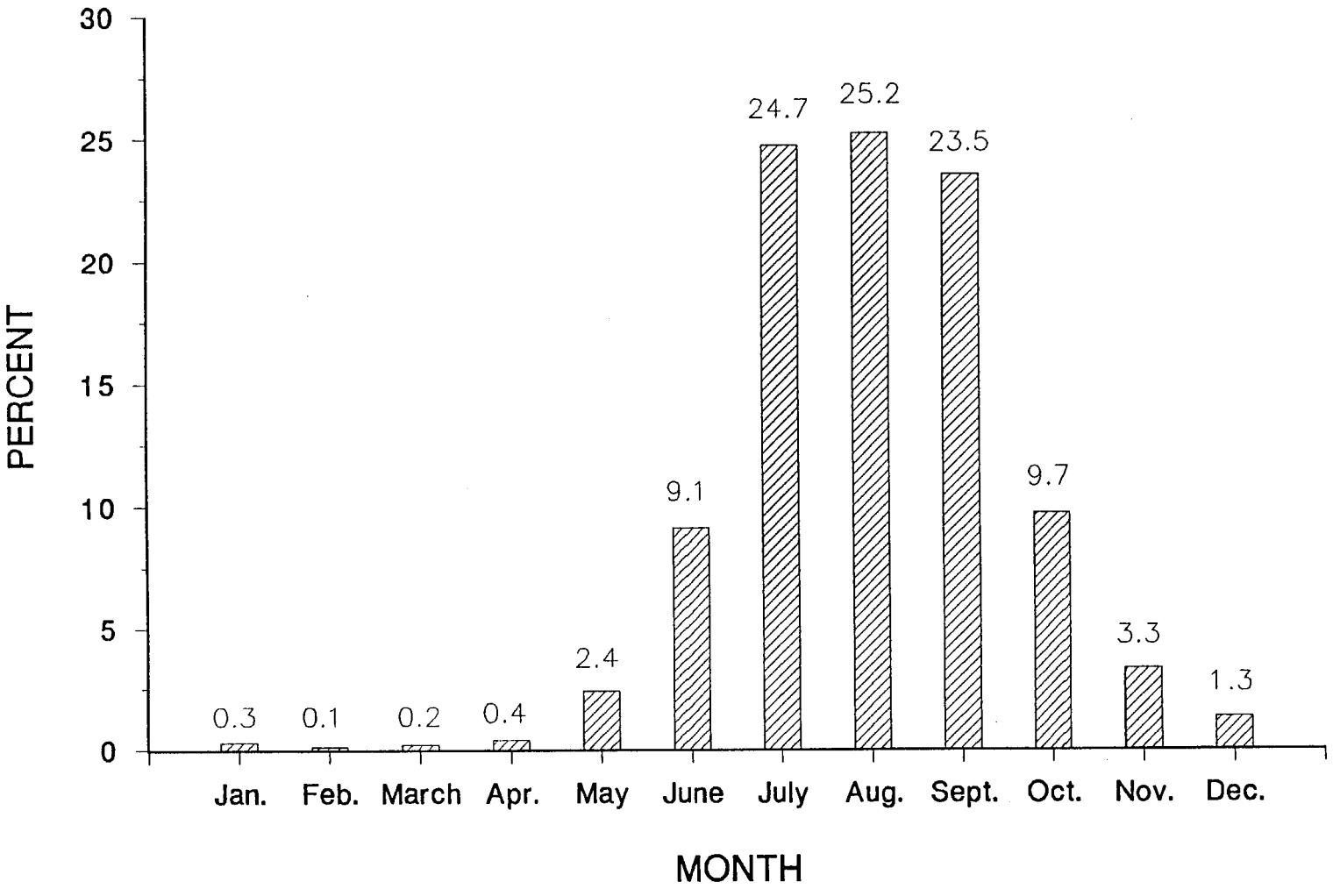

Figure 9. Dungeness crab catch (percent) by month, Cook Inlet Mgt. Area, 1978 - 1990.

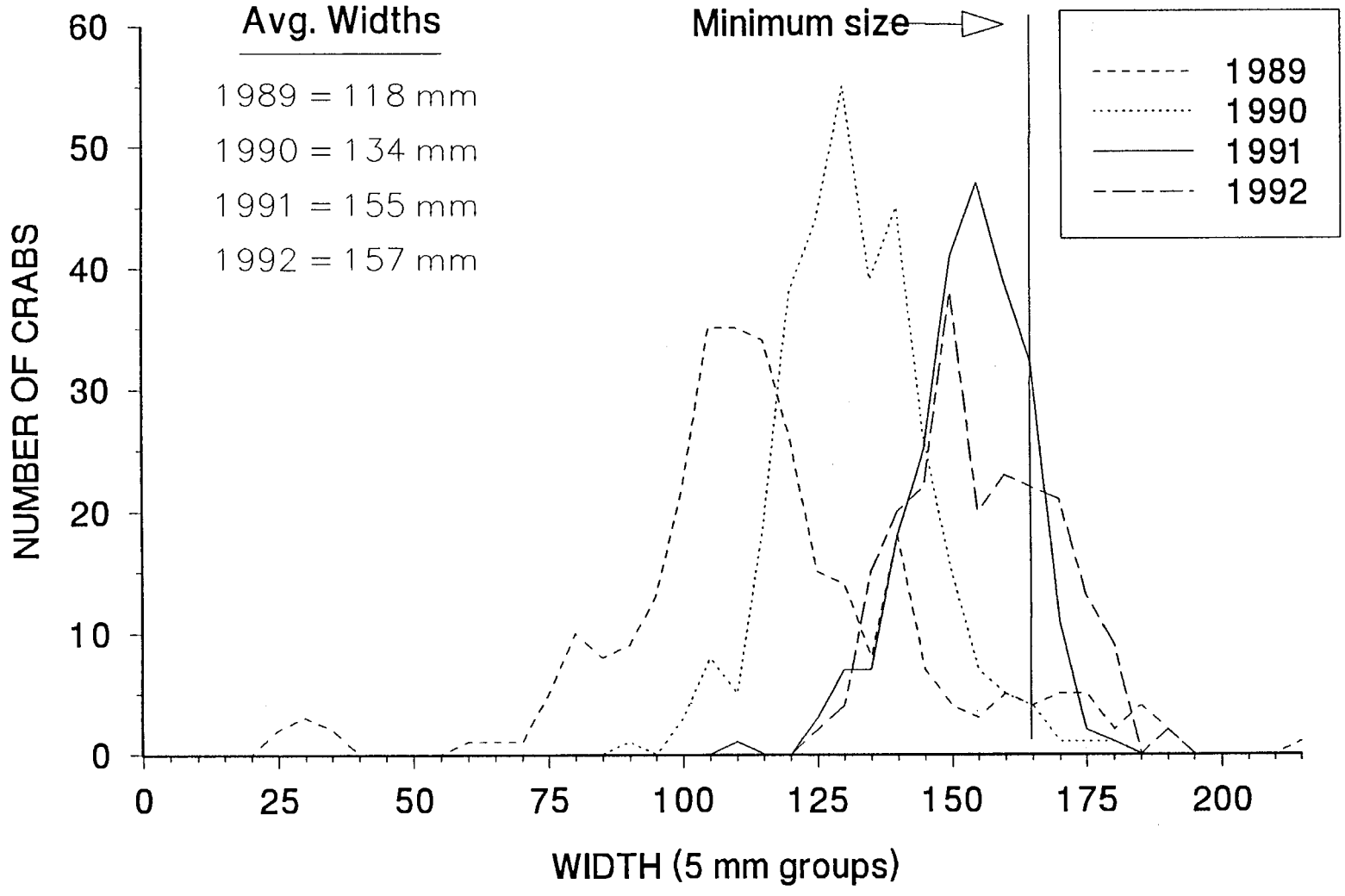

Figure 10. Male Dungeness catch, 1989 - 92, Southern Distr. trawl survey.

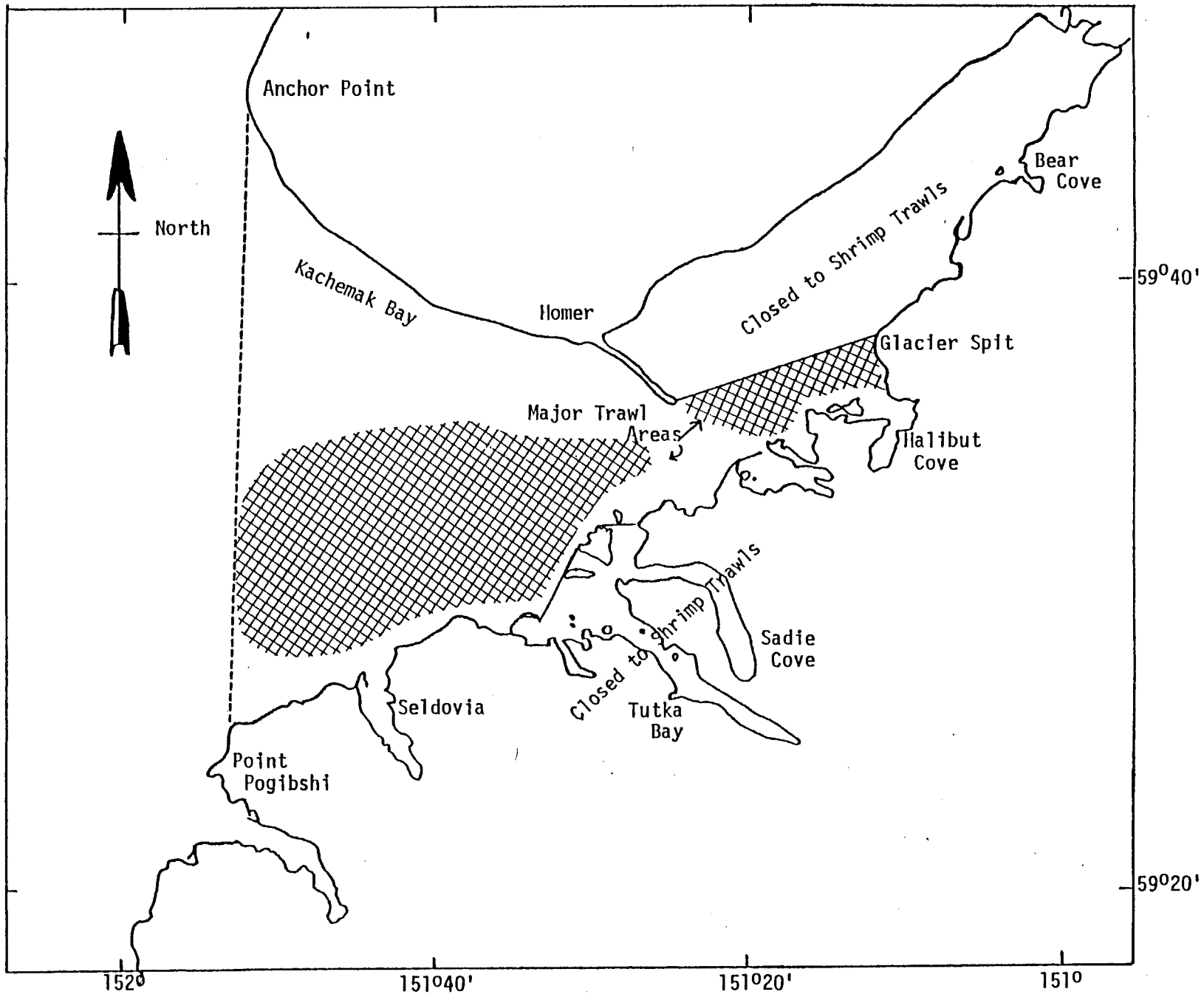

Figure 11. Location of commercial shrimp trawling in Kachemak Bay.

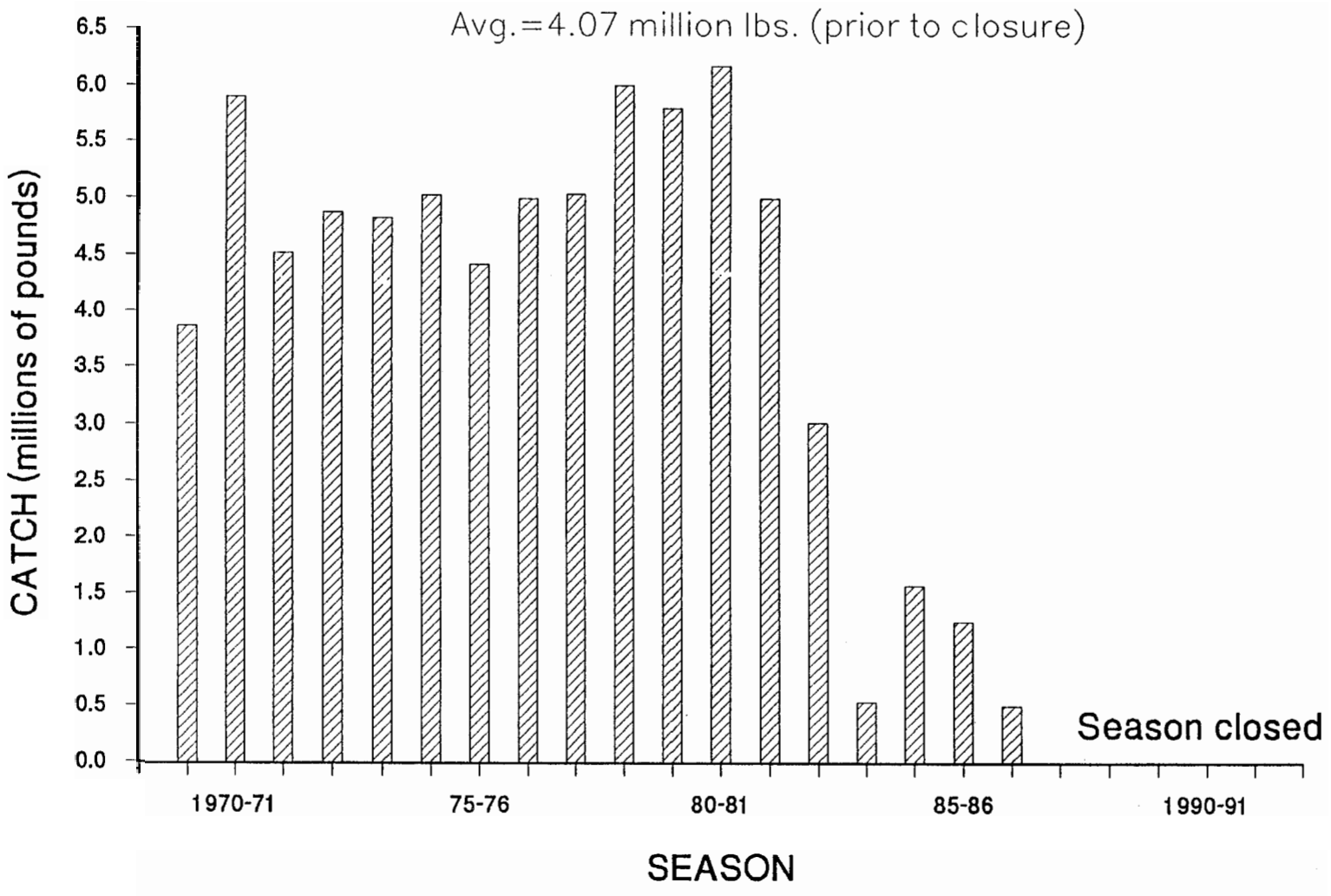

Figure 12. Trawl shrimp catch by season, Kachemak Bay, Cook Inlet Mgt. Area (H), 1969-93.

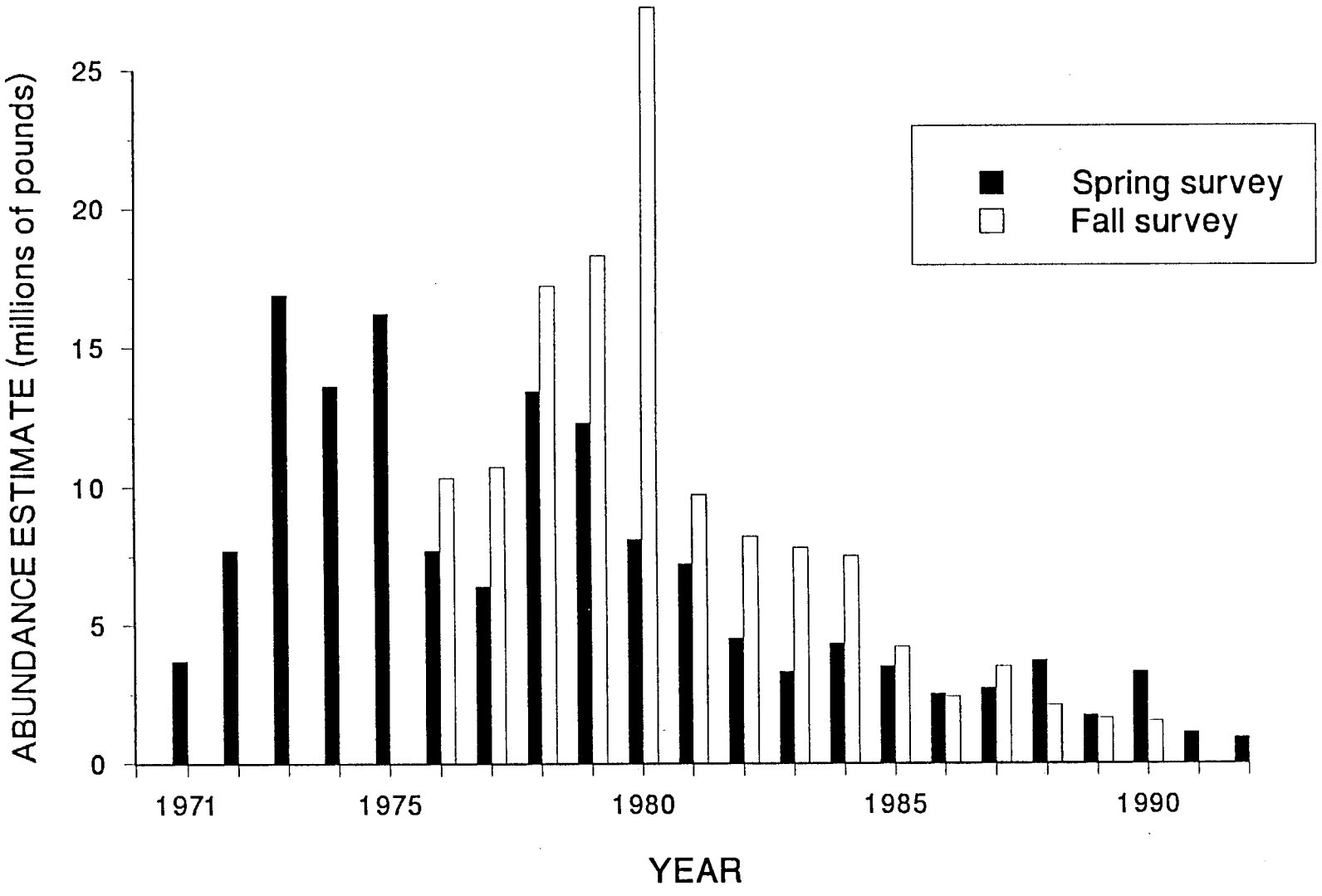

Figure 13. Pandalid shrimp population est., Kachemak Bay trawl shrimp survey, Cook Inlet Management Area, 1972-92.

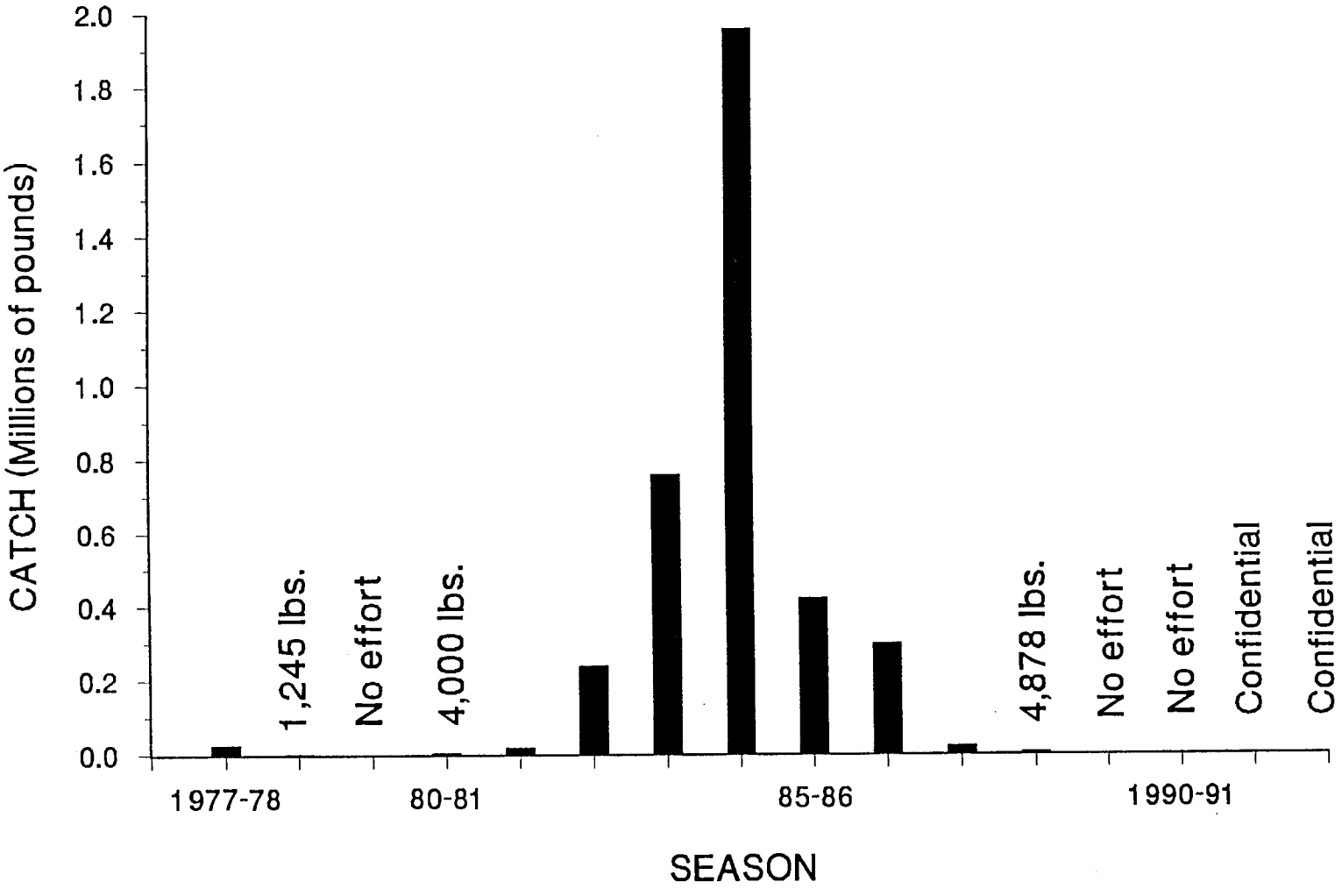

Figure 14. Trawl shrimp catch by season, Outer Cook Inlet, Cook Inlet Mgt. Area (G), 1977-1992

Figure 15. Pot shrimp catch by season, Kachemak Bay, Cook Inlet Mgt. Area (H) 1970-92

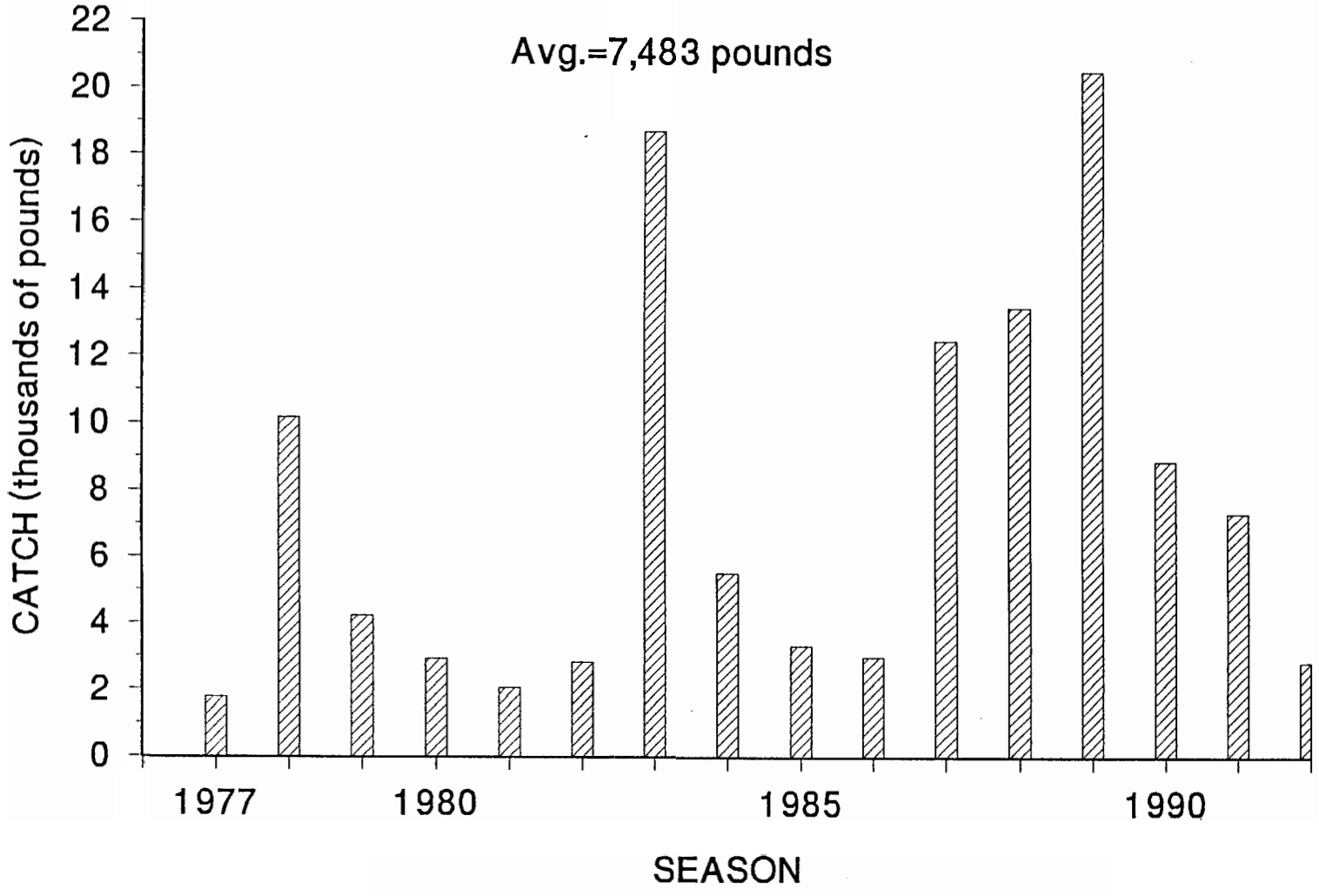

Figure 16. Pot shrimp catch by season, Outer Cook Inlet, Cook Inlet Mgt. Area (G), 1977-92.

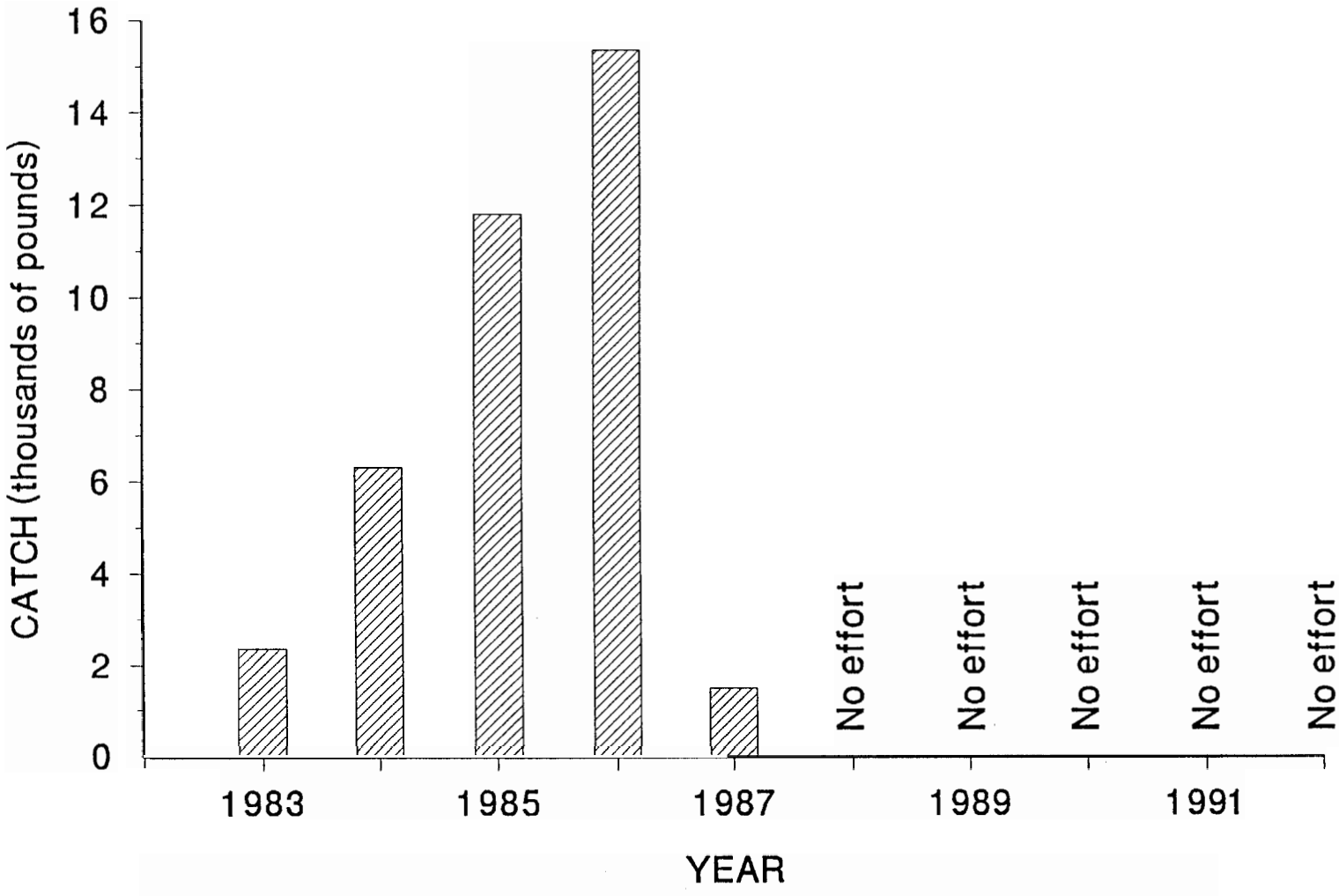

Figure 17. Weathervane scallop harvest by year, Cook Inlet Mgt. Area, 1983-1992.

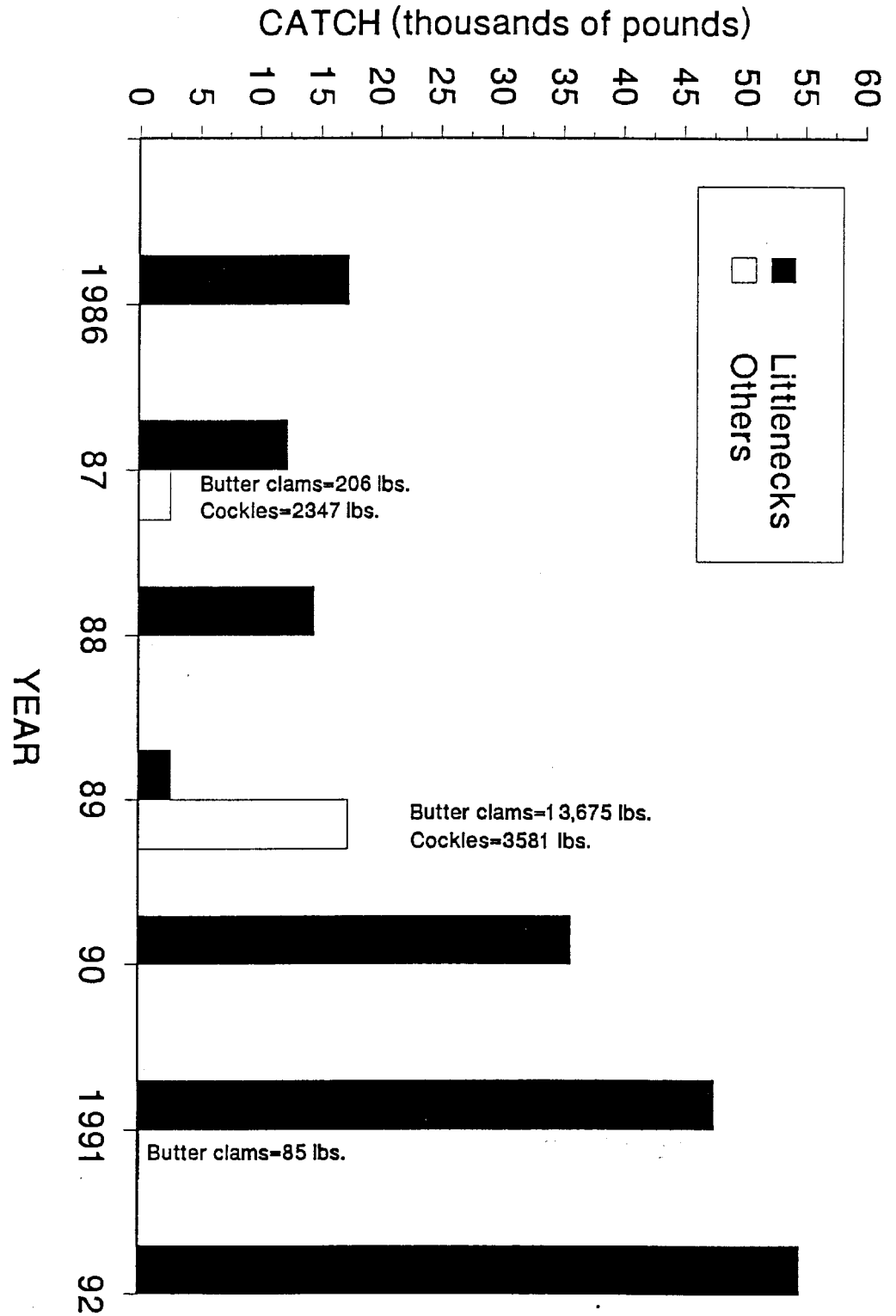

Figure 18. Hardshell clam harvest, Cook Inlet Management Area, 1986-92.

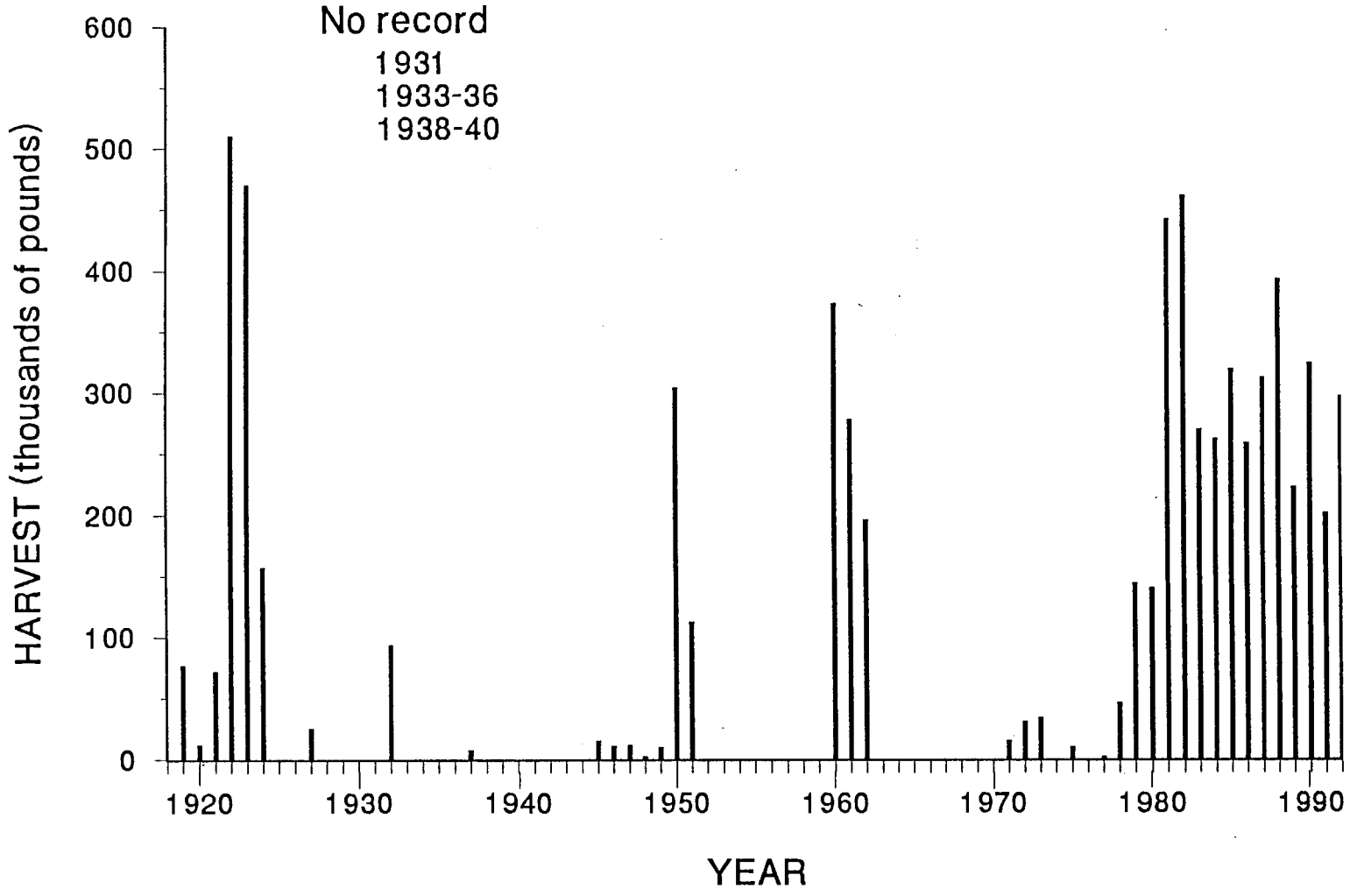

Figure 19. Razor clam harvest, Cook Inlet Management Area, 1919-92.

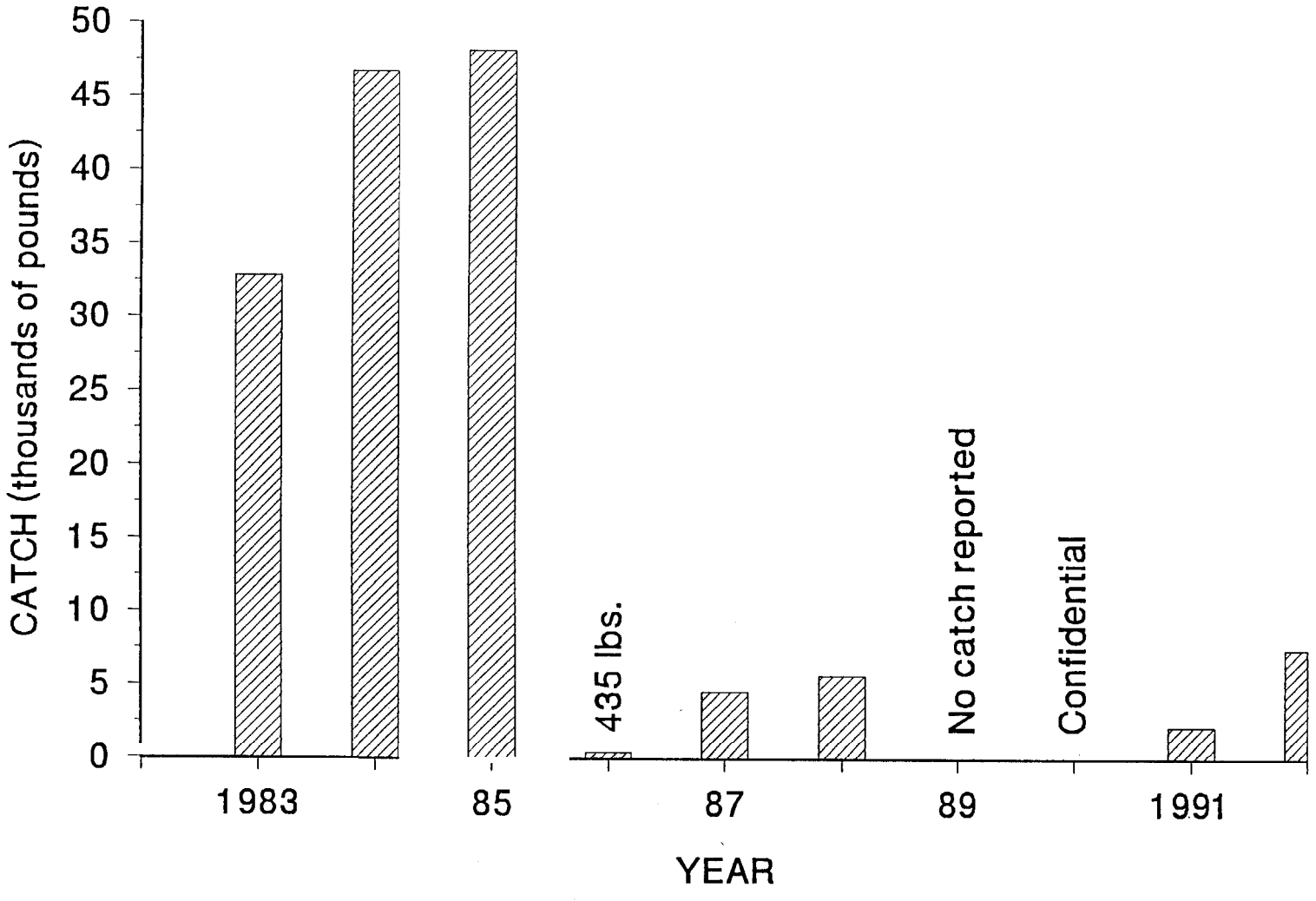

Figure 20. Octopus harvest, Cook Inlet Management Area, 1983-92.

Appendix A. Tanner crab catch (pounds) by season, Cook Inlet Management Area, 1968-93.

Season	Southern District	No. of Vessels	Kamishak/ Barren Is. District	No. of Vessels	Outer/ Eastern District	No. of Vessels	Central District	No. of Vessels	Total Catch	Total Vessels
1968-69	1,388,282		12,398		816				1,401,496	
1969-70	1,147,154		71,196		104,191				1,322,541	
1970-71	1,046,803		541,212		3,000				1,591,015	
1971-72	2,462,956		974,962		804,765				4,242,683	
1972-73	2,935,662		3,361,023		1,266,023				7,562,708	
1973-74	1,387,535		4,689,251		1,891,021				7,967,807	
1974-75	967,762		2,150,462		656,660				3,774,884	
1975-76	1,339,245		3,281,084	17	850,964				5,471,293	57
1976-77	2,009,633	35	1,765,926	24	824,520				4,600,079	67
1977-78	2,806,568	55	2,077,092	28	502,049				5,385,709	92
1978-79	2,323,420	75	2,713,339	27	694,728				5,731,487	77
1979-80	1,134,940	68	3,338,623	24	595,645				5,069,208	68
1980-81	1,047,630	46	1,757,331	20	463,201				3,268,162	52
1981-82	548,529	41	1,286,332	18	524,897	9			2,359,758	51
1982-83	584,908	48	1,693,794	20	682,919	20			2,961,621	65
1983-84	996,763	45	1,373,674	17	443,384	14			2,813,821	71
1984-85	1,229,298	83	1,535,547	19	259,083	7			3,023,928	86
1985-86	1,164,261	103	1,288,711	24	177,041	5			2,630,013	109
1987	1,077,379	87	1,111,339	21	251,174	13	7,771	2	2,447,663	95
1988	944,763	127	417,182	24	168,969	23	8,396	3	1,539,310	137
1989	CLOSED	--	CLOSED	--	CLOSED	--	CLOSED	--	0	--
1990	CLOSED	--	510,034	7	CLOSED	--	CLOSED	--	510,034	7
1991	271,379	68	266,106	8	CLOSED	--	CLOSED	--	537,485	71
1992	354,868	110	CLOSED	--	53,049	16	CLOSED	--	407,917	121
1993	534,003	136	CLOSED	--	CLOSED	--	CLOSED	--	534,003	136
Average[a]	1,001,667	66	1,243,237	17	331,803	9	2,310	1	2,577,659	73

[a] Since inception of minimum legal size between the 1976-77 season. Includes closed seasons.

Appendix B. Average weight of Tanner crabs, by district, from the commercial fishery, Cook Inlet Management Area, 1974-1993.

Season	Southern District	Kamishak/Barren Is. Districts	Outer/Eastern Districts	Central District
Prior to 1974	No data available			
1974-75	2.85	N/A	N/A	
1975-76	2.65	"	"	
1976-77	2.79	"	"	
1977-78	2.65	2.35	"	
1978-79	2.64	2.25	"	
1979-80	2.60	2.23	"	
1980-81	2.75	2.20	"	
1981-82	2.50	2.29	"	
1982-83	2.47	2.29	"	
1983-84	2.51	2.23	"	
1984-85	2.49	2.29	"	
1985-86	2.30	2.17	2.16	
1987[a]	2.31	2.26	2.23	2.33
1988	2.46	2.29	2.17	2.14
1989	CLOSED	CLOSED	CLOSED	CLOSED
1990	CLOSED	2.13	CLOSED	CLOSED
1991	2.56	2.09	CLOSED	CLOSED
1992	2.57	CLOSED	2.16	CLOSED
1993	2.54	CLOSED	CLOSED	CLOSED
Average	2.57	2.24	2.19	2.24

[a] Season opened by regulation 1/15/87. Prior to 1987, the season overlapped two calendar years.

Appendix C. Tanner crab population estimates in numbers by sex, size and age class, 1992 Cook Inlet trawl survey.

Males	Southern District	Kamishak and Barren Is. Districts
Sublegal		
<70 mm	306,159	251,834
70 - 91 mm	134,137	552,348
91 -114 mm		
new	438,453	360,846
o & vo	34,688	233,671
115 -139 mm		
new	683,607	166,434
o & vo	205,970	1,236,465
Legal		
140 -165 mm		
new	740,136	19,629
o & vo	138,101	193,576
≥166 mm		
new	49,547	0
o & vo	26,155	3,968
Total Legals	953,939	217,173
Total Males	2,756,953	3,018,771
FEMALES		
Juveniles	350,782	453,343
Adults	533,748	217,801
Total Females	884,530	671,144

Appendix D. King crab catch in pounds by season, Cook Inlet Management Area, 1960-93.

Season	District			Total Catch	Number of Vessels
	Southern	Kamishak/ Barren Is.	Outer/ Eastern		
1960-61	2,699,680	986,551	118,067	3,804,298	
1961-62	1,619,642	3,642,500	368,909	5,631,051	
1962-63	2,763,343	5,509,708	343,505	8,616,556	
1963-64	1,960,426	4,915,303	59,352	6,935,081	
1964-65	1,892,479	1,850,572	963	3,744,014	
1965-66	1,948,012	1,684,346	14,491	3,646,849	
1966-67	1,347,904	1,386,008	89,510	2,823,422	
1967-68	1,117,397	1,883,605	239,518	3,240,520	
1968-69	750,906	1,711,296	87,302	2,549,504	
1969-70	1,464,721	1,688,803	73,644	3,227,168	
1970-71	1,540,018	2,115,991	9,468	3,665,477	
1971-72	1,992,224	2,868,315	12,657	4,873,197	
1972-73	1,391,024	2,756,023	1,966	4,149,013	
1973-74	1,971,841	2,236,131	5,613	4,213,585	
1974-75	1,816,512	2,965,310	2,035	4,783,857	
1975-76	1,674,872	1,832,484	45,293	3,552,649	
1976-77	1,035,316	3,103,895	16,384	4,155,595	
1977-78	584,090	1,099,279	1,350	1,684,719	74
1978-79	664,388	480,261	1,753	1,146,402	89
1979-80	853,584	489,365	4,871	1,347,820	82
1980-81	508,670	1,635,922	8,022	2,152,614	50
1981-82	183,899	1,371,821	4,143	1,559,863	53
1982-83	CLOSED	807,079	15,280	822,359	27
1983-84	CLOSED	188,027	4,504	192,531	17
1984-85	CLOSED	CLOSED	CLOSED	0	--
1985-86	CLOSED	CLOSED	CLOSED	0	--
1986-87	CLOSED	CLOSED	CLOSED	0	--
1987-88	CLOSED	CLOSED	CLOSED	0	--
1988-89	CLOSED	CLOSED	CLOSED	0	--
1989-90	CLOSED	CLOSED	CLOSED	0	--
1990-91	CLOSED	CLOSED	CLOSED	0	--
1991-92	CLOSED	CLOSED	CLOSED	0	--
1992-93	CLOSED	CLOSED	CLOSED	0	--

Note: Average pre 1984-85 closure catch = 3.44 million pounds per year.

Appendix E. Dungeness crab catch by year, Cook Inlet Management Area, 1961 - 1992.

Year	Southern district catch (lbs.)	Other districts catch (lbs.)	Total catch (lbs.)	No. of Vessels	No. of Landings
1961	193,683	0	193,683		
1962	530,770	0	530,770		
1963	1,665,599	11,605	1,677,204		
1964	417,005	6,036	423,041		
1965	74,211	0	74,211		
1966	12,523	117,037	129,560		
1967	7,168	0	7,168		
1968	484,452	3,407	487,859		
1969	49,894	0	49,894		
1970	209,819	0	209,819		
1971	97,161	0	97,161		
1972	38,930	0	38,930		
1973	308,777	1,271	310,048		
1974	718,729	2,514	721,243	38	619
1975	361,893	922	362,815	34	402
1976	118,903	395	119,298	19	123
1977	74,195	510	74,705	18	94
1978	1,212,571	3,208	1,215,779	49	668
1979	2,130,963	0	2,130,963	72	1,485
1980	1,875,281	0	1,875,281	54	1,183
1981	1,850,977	0	1,850,977	88	2,047
1982	818,380	505	818,885	108	2,310
1983	746,585	834	747,419	71	1,194
1984	799,638	570	800,208	102	1,687
1985	1,389,891	12,511	1,402,402	106	1,768
1986	550,968	12,894	563,862	83	1,069
1987	761,423	21,753	783,176	100	1,377
1988	677,334	41,941	719,275	84	1,305
1989	170,266	7,798	178,064	43	455
1990	28,938	564	29,502	23	112
1991	CLOSED	0	0	0	0
1992	CLOSED	Confidential	Confidential		

Note: Average catch 1978-1990 = 1.01 million pounds per year.

Appendix F. Dungeness commercial catch east and west of Homer Spit, Southern District, Cook Inlet Management Area, 1978-1992.

Year	East of Spit Catch (lbs.)	East of Spit Vessels	West of Spit Catch (lbs.)	West of Spit Vessels
1978	107,470	21	1,105,101	54
1979	290,829	54	1,840,134	81
1980	375,056	44	1,500,225	61
1981	1,237,694	84	613,283	65
1982	636,789	100	181,591	71
1983	463,968	62	282,617	43
1984	563,659	82	235,979	65
1985	783,607	93	606,284	60
1986	249,183	57	301,785	34
1987	291,206	67	470,217	38
1988	426,531	55	250,803	39
1989	98,215	36	72,051	15
1990	10,495	18	18,433	10
1991[a]			Season Closed	
1992			Season Closed	
Average	425,746	59	575,269	49

[a] 1991 season not included in average.

Appendix G. Trawl shrimp catches from the Kachemak Bay trawl shrimp fishery in the Cook Inlet Management Area, 1969-1993.

SEASON	NUMBER OF VESSELS	CATCH (lbs) JUN 1-OCT 31	NOV 1-MAR 31	APR 1-MAY 31	TOTAL
1969-70[a]	7	1,289,656	1,692,854	889,330	3,871,840
1970-71[a]	3	3,211,924	2,076,228	617,836	5,905,988
1971-72[a]	7	2,618,630	1,761,569	140,707	4,520,906
1972-73[a]	10	2,772,422	2,109,660		4,882,082
1973-74[b]	13	2,502,154	2,323,780		4,825,934
1974-75	4	2,512,764	2,519,148		5,031,912
1975-76	4	1,997,563	2,421,456		4,419,019
1976-77	5	2,545,885	2,453,101		4,998,986
1977-78	7	2,490,969	2,546,977		5,037,946
1978-79	6	2,952,733	3,060,066		6,012,799
		JUL 1-SEP 30	OCT 1-DEC 31	JAN 1-MAR 31	
1979-80	7	2,013,298	2,052,646	1,731,483	5,797,427
1980-81	15	1,780,298	2,691,746	1,704,706	6,177,129
1981-82	23	1,614,868	1,686,781	1,693,850	4,995,499
1982-83	15	998,522	1,012,388	1,009,857	3,020,767
1983-84	10	CLOSED	CLOSED	525,508	525,508
1984-85	10	519,651	528,506	518,529	1,566,686
1985-86	5	488,606	257,782	503,340	1,249,728
1986-87	3	504,206	CLOSED	CLOSED	504,206
1987-88	0	CLOSED	CLOSED	CLOSED	0
1988-89	0	CLOSED	CLOSED	CLOSED	0
1989-90	0	CLOSED	CLOSED	CLOSED	0
1990-91	0	CLOSED	CLOSED	CLOSED	0
1991-92	0	CLOSED	CLOSED	CLOSED	0
1992-93	0	CLOSED	CLOSED	CLOSED	0

[a]Catches listed for comparative purposes by seasons established in 1973.

[b]June 1 - October 31 and November 1 - March 31 seasons with respective guidelines established.

Appendix H. Trawl shrimp catches in Outer Cook Inlet (Area G), Cook Inlet Management Area, 1977-93.

Season	Number of Vessels	Catch (lbs.)
1977-78	2	26,556
1978-79	1	1,245
1979-80	0	0
1980-81	1	4,000
1981-82	2	19,454
1982-83	4	239,584
1983-84	7	760,430
1984-85	11	1,957,959
1985-86[a]	4	421,063
1986-87	2	297,762
1987-88	1	22,231
1988-89	1	4,878
1989-90	0	0
1990-91	0	0
1991-92	2	CONFIDENTIAL
1992-93	2	CONFIDENTIAL

[a]Regulatory season of 1 June through 28 February adopted by the Alaska Board of Fisheries in spring, 1985.

Appendix I. Pot shrimp harvest in Area H, Cook Inlet Management Area, 1969-93.

Season	Catch (lbs.) JUN 1 - SEP 30	OCT 1 - MAY 31	Total	Vessels
1969-70				
1970-71	3,606	7,602	11,208	
1971-72	8,836	70,601	79,437	
1972-73	75,247	184,230	259,477	
1973-74	63,181	738,165	801,346	
1974-75	43,650	126,472	170,122	
1975-76	100,765	273,758	374,523	
1976-77	52,115	199,559	251,674	26
1977-78	85,511	511,938	597,449	51
1978-79	49,080	121,234	170,314	41
1979-80	59,963	177,927	237,890	49

	JUN 1 - SEP 15 Vessels	NOV 1 - DEC 31 Vessels	FEB 1 - MAR 31 Vessels		
1980-81	74,368	134,275	104,716	313,359	30
1981-82	56,092	47,859	49,885	153,836	45
1982-83	54,153	49,130	52,339	155,622	40
1983-84	21,438	CLOSED	CLOSED	21,438	15
1984-85	25,874	28,151[a]	22,080	76,105	22

	JUN 1 - SEP 15 Vessels		OCT 1 - DEC 31 Vessels		FEB 1 - MAR 31 Vessels			
1985-86	27,312		20,737		24,048[b]		72,097	25
1986-87	24,844	18	20,188	11	30,257	19	75,289	37
1987-88	26,216	26	5,416[c]	8	CLOSED		31,632	30
1988-89	5,323[d]	9	CLOSED		CLOSED		5,323	9
1989-90	CLOSED		CLOSED		CLOSED		0	
1990-91	CLOSED		CLOSED		CLOSED		0	
1991-92	CLOSED		CLOSED		CLOSED		0	
1992-93	CLOSED		CLOSED		CLOSED		0	

[a]Season extended through 1/31/85.

[b]Season extended through 4/5/86 due to eruptions of Augustine volcano and subsequent ash fallout.

[c]Season closed by E.O. on 11/13/87 due to low CPUE and high incidence of small shrimp.

[d]Season closed by E.O. on 6/22/88 due to limited amount of CPUE information and depressed stocks.

Appendix J. Pot shrimp catch and effort in Outer Cook Inlet (Area G), Cook Inlet Management Area, 1977-92.

Season	Number of Vessels	Catch (lbs.)
1977	6	1,776
1978	11	10,157
1979	5	4,211
1980	3	2,911
1981	5	2,031
1982	7	2,805
1983	13	18,679
1984	5	5,504
1985	6	3,305
1986	4	2,967
1987	9	12,458
1988	7	13,445
1989[a]	8	20,500
1990	5	8,853
1991	8	7,315
1992	3	2,804
		Average = 7,483

[a]Season closed from April 30 through July 7 due to *Exxon Valdez* oil spill.

Appendix K. Pacific weathervane scallop catches, Cook Inlet Management Area, 1983-92.

Year	District	Number of Vessels	Catch (lbs) of Shucked meats
1983	Kamishak	1	2,346
1984	Kamishak	3	6,305
1985[a]	Kamishak	1	11,810
1986	Kamishak	3	15,364
1987	Outer Kamishak[b]	1	1,128
		2	360
	'87 Total	2	1,488
1988	NO EFFORT		
1989	NO EFFORT		
1990	NO EFFORT		
1991	NO EFFORT		
1992	NO EFFORT		

[a]Season and harvest guideline set by regulation.

[b]Season closed by E.O. on August 21, 1987, one week after opening, due to low C.P.U.E.

Appendix L. Harvest of hardshell clams, Cook Inlet Management Area, 1986-92.

Year	No. of Permits	No. of Landings	Pacific Little necks	Butter Clams	Cockles	Total Pounds
1986	5	18	17,303	0	0	17,303
1987	8	69	12,214	206	2,347	14,767
1988	2	32	14,449	0	0	14,449
1989	9	41	2,584	13,675[a]	3,581[b]	19,840
1990	19	62	35,744	0	0	35,744
1991	19	78	47,586	85	0	47,571
1992	21	117	54,631	0	0	54,631

[a] Includes 13,348 pounds sold as otter food as a result of *Exxon Valdez* oil spill.

[b] Includes 1,981 pounds sold as otter food as a result of *Exxon Valdez* oil spill.

Appendix M. Harvest of blue mussels, Cook Inlet Management Area, 1986-92.

Year	No. of Permits	No. of Landings	Blue Mussel Total Pounds
1986	0	0	0
1987	1	2	102
1988	0	0	0
1989	9	98	167,243[a]
1990	2	10	CONFIDENTIAL
1991	3	11	16,485
1992	3	11	2,501

[a]Includes 165,268 pounds sold as otter food as a result of *Exxon Valdez* oil spill.

Appendix N. Harvest of razor clams Cook Inlet Management Area, 1919-1992.

Year	Pounds	Year	Pounds
1919	76,963	1955	0
1920	11,952	1956	0
1921	72,000	1957	0
1922	510,432	1958	0
1923	470,280	1959	0
1924	156,768	1960	372,872
1925	0	1961	277,830
1926	0	1962	195,650
1927	25,248	1963	0
1928	0	1964	0
1929	0	1965	0
1930	0	1966	0
1931	No record	1967	0
1932	93,840	1968	0
1933	No record	1969	0
1934	No record	1970	0
1935	No record	1971	14,755
1936	No record	1972	31,360
1937	8,328	1973	34,415
1938	No record	1974	0
1939	No record	1975	10,020
1940	No record	1976	0
1941	0	1977	1,762
1942	0	1978	45,931
1943	0	1979	144,358
1944	0	1980	140,240
1945	15,000	1981	441,949
1946	11,424	1982	460,639
1947	11,976	1983	269,618
1948	2,160	1984	261,742
1949	9,672	1985	319,034
1950	304,073	1986	258,632
1951	112,320	1987	312,349
1952	0	1988	392,610
1953	0	1989	222,747
1954	0	1990	323,533
		1991	201,320
		1992	296,727

Appendix O. Octopus harvests in the Cook Inlet Management Area (H) 1983-92.

Year	No. of Vessels	No. of Landings	Total Pounds
1983	41	101	32,841[a]
1984	36	77	46,698[a]
1985	40	70	48,067[a]
1986	8	16	435
1987	21	57	4,512
1988	17	43	5,569
1989	N O	R E P O R T E D	L A N D I N G S
1990		C O N F I D E N T I A L	
1991	8	21	2,088
1992[b]	22	55	7,447

[a] Bycatch from shellfish pot fisheries.

[b] Bycatch from groundfish fisheries 1992.

Appendix P. Green sea urchin harvest, Cook Inlet Management Area, 1987-92.

Year	No. of Divers	Total Pounds
1987	1	224
1988	N O	E F F O R T
1989[a]	1	15,181
1990	N O	E F F O R T
1991[b]	4	20,445
1992[b]	7	6,119

[a]Season extended from June 1989 through February 1990 (normal season September 15 through December 15).

[b]Season extended to January 31 of the following year.